

SPECIFICATIONS

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CANISTER STORAGE BLDG

B-595-C-E350

HANFORD WASTE VITRIFICATION PLANT

**U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE**



**FLUOR DANIEL
ADVANCED TECHNOLOGY DIVISION
CONTRACT 8457**

**DOE CONTRACT NO.
DE-AC06-86RL10838**

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

CANISTER STORAGE BUILDING
SPECIFICATION B-595-C-E350

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-499, 690, 702, 854, 859 & 884

ISSUE DATE 8/1/93

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Rev. 1

CANISTER STORAGE BUILDING
B-595-C-E350

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SECTION 03010
METALLIC TOPPING
B-595-C-E350-03010

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WAPA YES NO X
QUALITY LEVEL I X II
SAFETY CLASS 1 X 2 3 4

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SECTION 03010
METALLIC TOPPING
B-595-C-E350-03010

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SECTION 03010 METALLIC TOPPING

PART 1 GENERAL

1.1 SUMMARY

This section covers technical requirements for the preparation of concrete floor surfaces and the furnishing and installation of traffic topping.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 503R 1989 Use of Epoxy Compounds with Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C109 1990 Standard Test Method for Compressive
Strength of Hydraulic Cement Mortars
(Using 2-inch or 50 mm Cube Specimens)

ASTM C131 1989 Standard Test Method for Resistance
to Degradation of Small-Size Coarse
Aggregate by Abrasion and Impact in the
Los Angeles Machine

ASTM C309 1991 Standard Specification for Liquid
Membrane Forming Compounds for Curing
Concrete

ASTM C779 1989 Rev. A Standard Test Method for
Abrasion Resistance of Horizontal Concrete
Surfaces

ASTM D2240 1986 Standard Test Method for Rubber
Property - Durometer Hardness

ASTM D4258 1983 Standard Practice for Surface
Cleaning Concrete for Coating

ASTM D4259 1988 Standard Practice for Abrading
Concrete

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ASTM D4263 1983 Standard Test Method for Indicating
Moisture in Concrete by the Plastic Sheet
Method

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NACE RP0172 1972 Surface Preparation of Steel and
Other Hard Materials by Water Blasting
Prior to Coating or Recoating

1.3 **RELATED REQUIREMENTS**

Specification Section 01730 Operation and Maintenance Data

Specification Section 03300 Cast-in-Place Concrete

1.4 **DEFINITIONS**

1.4.1 **Metallic Aggregate**

Size graded, processed iron aggregate.

1.4.2 **Green Concrete**

Concrete less than 3 days old.

1.5 **SYSTEM DESCRIPTION**

Traffic topping shall be a pre-proportioned, pre-mixed, factory packaged, heavy-duty metallic aggregate floor topping providing protection against abrasion and impact. The system shall be capable of sustaining loads imposed by an eight-wheeled transport vehicle weighing approximately 340,000 pounds and shall be impervious to fluids and chemicals which might exude therefrom (e.g., brake fluid, hydraulic fluid, diesel fuel, etc.). The system shall remain effective for not less than 40 years with the floor at an average constant temperature of 115°F. The system shall be capable of sustaining a vertical deflection of one inch in 50 feet of span without adverse effect on integrity and chemical resistance.

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Product Data including Material Safety Data Sheets (MSDS)**

1.6.1.1 **Topping**

1.6.1.2 **Curing Material**

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1.6.1.3 Epoxy Bonding Agent

1.6.1.4 Bonding Compound

1.6.1.5 Joint Filler

1.6.2 Samples

Submit samples of material and acceptable finish for review by Buyer before starting work. Coordinate procurement and selection of materials with Buyer to obtain acceptable quality and finish in completed work.

1.6.3 Test Reports

Submit test reports made within the previous three years of the date of issue of this section on samples of the products herein described. Such test reports shall be by nationally recognized laboratories or laboratories acceptable to the Buyer. Test Reports should include dates of testing, locations from which samples were obtained, and test results including compressive strengths, abrasion resistance, impact resistance, and bond strengths of epoxy bonding agent.

1.6.4 Certificates of Compliance

Submit a certificate from the manufacturer stating that products proposed to be used in the work comply with the requirements specified.

1.6.5 Sample Panels or Sample Installations

Begin work in a location designated by the Buyer, a minimum of 100 square feet. The installation procedure is of prime importance. When approved by the Buyer, maintain the same controls and procedures throughout the remainder of the job. All work must be of the quality approved in the sample area. The sample area may be incorporated into the work area.

1.6.6 Operation and Maintenance (O&M) Manuals

Submit manufacturer's printed maintenance instructions in accordance with Specification Section 01730, "Operation and Maintenance Data". The submittal shall include a list of local service companies.

1.6.7 Warranty

1.6.7.1 Complete application shall be warranted jointly for materials and labor on a single document, by the Seller against defects of materials and workmanship.

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1.6.7.2 Warranty shall include all labor and material necessary to complete the required scope of work.

1.6.7.3 Warranty shall be for a period of not less than 5 years from the date of acceptance of the work.

1.7 **CLASSIFICATION OF SYSTEM AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

1.8.1 Climatic and Geographic Site Conditions

A. Site Elevation 714 feet above sea level

B. Barometric Pressure 14.3 psia

C. Outside Design Temperature

1) Maximum Design Temperature 115°F

2) Minimum Design Temperature -27°F

3) Wet Bulb Design Temperature 68°F

1.8.2 Operating Environment

A. Normal Temperature 60°F to 104°F

B. Relative Humidity Not controlled

1.9 **DELIVERY, STORAGE, AND HANDLING**

1.9.1 Deliver materials to the job site in the manufacturer's original, unopened packages, with labels intact, legible, and conspicuous. Provide the following information with all deliveries:

1.9.1.1 Name or title of material;

1.9.1.2 Manufacturer's name, stock number, and date of manufacture;

1.9.1.3 Application instructions;

1.9.1.4 Material Safety Data Sheets (MSDS) complete for each shipment.

1.9.2 Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 35°F. Provide storage facilities outside of buildings being constructed.

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1.9.3 Protect from freezing. Keep storage area neat and orderly. Remove rags and waste daily. Take necessary precautionary measures to ensure that workmen and work areas are adequately protected from fire hazards and health hazards associated with handling, mixing, and applying topping.

1.9.4 Ensure that storage and application areas are adequately ventilated.

1.10 **QUALITY ASSURANCE**

1.10.1 **Materials**

All materials of the metallic topping system, including topping, curing material, bonding agent, bonding compound, joint filler, and other additives shall be products of a single manufacturer. Application of multiple manufacturers' products is strictly prohibited.

1.10.2 **Installer**

The metallic topping specified in this section shall be prepared and installed by a single installer approved by the manufacturer of the materials.

1.10.3 **Pre-Installation Conference**

Prior to the preparation of surfaces and the installation of any metallic topping, a pre-installation conference shall be convened at the project site to review the material selections, application procedures, and coordination of the work with other trades. The meeting shall be attended by the Buyer, the Seller, the metallic topping manufacturer's representative, and all other principals involved in or affected by the work.

1.10.4 **Inspection**

Inspection by the Buyer, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve the installer of his responsibility to perform the work in accordance with this Specification Section and per the manufacturer's written instructions.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 General

The products herein described are manufactured by Master Builders, Inc. (Cleveland, Ohio); or by The Euclid Chemical Company (Cleveland, Ohio). They are intended to establish minimum acceptable standards of quality of materials, finish, or workmanship, and are not intended to exclude from consideration comparable products of other manufacturers. Products of other manufacturers will be permitted provided such materials are minimally of equal quality and of the required characteristics for the purpose intended, subject to authorization by the Buyer.

2.1.2 Topping

"Anvil-Top 300"; "Super Euco-Top"; processed iron aggregate topping consisting of specially processed, size graded iron aggregate (not a naturally occurring mineral aggregate), cement, and technical components necessary to produce screedable, metallic floor topping. Material shall be ready to use and require only addition of potable water at jobsite, and shall be sealed in moisture resistant bags. Material shall be free from non-ferrous particles, rust, and materials intended to disguise rust.

2.1.2.1 Slump

Slump shall be 5 to 7 inches screedable consistency.

2.1.2.2 Compressive Strength

The minimum compressive strengths of 2 (two) inch cubes tested in accordance with ASTM C109 shall be:

7,000 psi at 1 day
9,000 psi at 3 days
10,000 psi at 7 days
12,000 psi at 28 days

2.1.2.3 Abrasion Resistance

When tested in accordance with ASTM C779, 60 minutes of abrasion shall not exceed 0.009 inch.

2.1.2.4 Impact Resistance

When tested in accordance with ASTM C131 (Los Angeles Rattler Test), 2,000 cycles shall not result in an excess of 35% material loss.

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2.1.3 Curing Material

"Masterkure 200 W"; "Super Diamond Clear Vox"; 30 percent solids, water based, wax emulsion concrete curing and sealing compound. Material shall meet or exceed moisture retention requirements of ASTM C309, Type 1 liquid membrane forming curing compounds.

2.1.4 Epoxy Bonding Agent

"Anvil Bond"; "Euco #452 MV"; two component, 100% reactive, modified aliphatic amine epoxy resin containing no solvents, fillers, or colorants and formulated to bond cement based floor topping mixes. The bond strength shall be 100 percent of the value at 70°F for temperatures up to 200°F.

2.1.5 Bonding Compound

Pre-packaged, pre-mixed polymer modified bonding slurry formulated for bonding iron armored high performance floor topping to green concrete.

2.1.6 Control Joint Filler

"Masterfill CJ"; "Euco 700"; two component, 100% solids, semi-rigid, epoxy filler manufactured by the floor topping manufacturer for the purpose of filling control joints. Minimum Shore D Hardness shall be 55 in accordance with ASTM D2240.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Surface of the floor shall be screeded and prepared in accordance with the topping manufacturer's written requirements unless otherwise specified. Surfaces shall be free of grease, oil, and other contaminants before further mechanical or chemical preparation. All surfaces shall be prepared with the objective of obtaining a clean, dry, and properly prepared substrate.

3.1.2 Concrete Surfaces

3.1.2.1 Curing Period

Not less than 28 days for fully cured concrete, or as specified in Specification Section 03300, "Cast-in-Place Concrete", whichever is greater for topping applied on hardened concrete.

3.1.2.2 Form Release Agents

Form release agents used during the pouring of the concrete shall be removed unless known to be compatible with the topping system selected.

3.1.2.3 Curing Compounds

Concrete curing compounds shall not be used on the base concrete slab.

3.1.2.4 Contaminants

Oil, grease, and similar materials shall be removed by scraping off heavy deposits, followed by washing of contaminated areas with detergent and water in accordance with ASTM D4258.

3.1.2.5 Blasting

Incompatible form oils, surface laitance, cement glaze, and efflorescence shall be removed by abrasive blast cleaning in accordance with ASTM D4259. Abrasive used for blasting shall be a maximum of 20-40 mesh and air pressure shall be reduced to prevent excess removal of concrete and exposure of aggregate. Concrete surfaces shall be blasted to a uniform roughness having a surface texture resembling medium grit sandpaper. Where dust from blasting cannot be tolerated, blasting with water injection may be used to eliminate dust. Waterblasting with sand injection may also be used to produce an acceptable surface with no dusting from blasting.

Waterblasting in accordance with NACE RP0172 with a pressure of 3000 to 5000 psi will effectively remove the surface laitance and contaminants without exposing aggregate.

Where dust or water cannot be tolerated, vacuum blasting units may be utilized.

3.1.2.6 Acid Etching

Not allowed.

3.1.2.7 Moisture

Surfaces receiving topping shall be tested for the presence of moisture prior to application of the topping by using the plastic sheet method in accordance with ASTM D4263 unless otherwise specified. Concrete must be completely dry prior to application of topping.

3.2 **INSTALLATION, APPLICATION AND ERECTION**

3.2.1 General

Application may be over green concrete (Monolithic Application), over fully cured concrete, or over concrete between these two conditions. Application over green concrete is the preferred method. Application shall be in accordance with the manufacturer's written instructions unless otherwise specified.

3.2.2 Environmental conditions

Temperature of materials and substrate shall be in accordance with the manufacturer's written instructions. If the manufacturer has no written instructions, then the material and substrate shall be between 50°F and 80°F for 24 hours before, during, and after installation unless otherwise specified.

3.2.3 Humidity

Humidity shall be measured in the area receiving topping. The humidity shall be within the range specified in the manufacturer's written instructions. If the manufacturer has no written instructions, no material shall be applied when the relative humidity is above 85% or the temperature of the surface is less than 5°F above the dew point unless otherwise specified.

3.2.4 Chemical Contamination

If chemical contamination occurs, it shall be removed by washing with water or solvent, and the surface dried before applying the next coat.

3.2.5 Monolithic Application

3.2.5.1 At the time of concrete placement, the base slab shall be mechanically scarified (nailraked) to create a mechanical bond for the topping. This step should be undertaken after the first floating of the slab so as to consolidate and densify the slab. Profile in one direction only; do not rake in a "criss-cross" pattern. Do not dislodge or intentionally bury any large aggregate at the surface as this aggregate will aid in the mechanical bond of the topping.

- 3.2.5.2 Wet cure the slab until topping application.
- 3.2.5.3 Wait until the surface will support the weight of foot traffic without breaking the nailraked ridges (at least 24 hours) before proceeding with placement of the topping. Topping must be applied within 72 hours after the finish of the concrete placement.
- 3.2.6 Application Over Concrete After 3 Days but Before Fully Cured
 - 3.2.6.1 Prepare base slab as for monolithic application.
 - 3.2.6.2 Upon preparing to apply the bonding compound, closely examine the base slab surface to ensure that the slab is sufficiently set and there is no loose aggregate or debris present which may hinder in the bond of the topping.
 - 3.2.6.3 Prepare the bonding compound and brush over the surface of the base slab just prior to the application of the topping. Use a clean, stiff bristle, street broom for application and insure that the bonding compound is brushed into the nailraked grooves and covers the entire damp surface profile.
 - 3.2.6.4 If bonding compound dries prior to being covered with topping, do not retemper. Reapply another coat of bonding compound prior to proceeding with topping application.
- 3.2.7 Application Over Fully Cured Concrete
 - 3.2.7.1 Prior to preparing the floor for topping application, make a detailed map showing any base cracks or joints that may mirror in the placed topping. Alternatively, permanently seal all major cracks no sooner than 18 hours prior to application of bonding agent. Sealing material shall be as recommended by manufacturer of the topping system.
 - 3.2.7.2 Prepared surface soundness shall be tested through the use of an Elkometer, according to procedures specified in ACI 503R, and have a minimum tensile strength of 175 psi.
 - 3.2.7.3 Mechanical fasteners will help insure bond and reduce chances of edge curling. Drive 1 3/4 inch concrete nails into concrete at a minimum of 6 inches from joints and 12 inches on centers, staggered.
 - 3.2.7.4 Shotblast with proper sized shot, or sandblast to degree in which it can be ascertained that a strong, dense surface is obtained over the entire area to receive topping. Small and medium sized aggregate should be exposed but surface must be moderately rough and not polished.

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- 3.2.7.5 Base slab must be clean of all oil, debris, dust, and other foreign matter which may hinder bond. Follow with complete cleaning using compressed air.
- 3.2.7.6 Test surface for hardness with a sharp, tempered nail or knife to assure sound surface. Further test slab for presence of carbonated contaminants with dilute acid or phenolphthalein.
- 3.2.7.7 Apply bonding agent in a uniform coat with a short nap roller, squeegee, stiff brush, or broom in accordance with the manufacturer's written instructions. Bonding agent must be wet or tacky when topping is applied. If bonding agent becomes hard, a fresh application of bonding agent shall be applied within 24 hours of the first bond coat; thereafter, the surface must be reabraded.
- 3.2.7.8 Placement of topping over hardened bonding agent will not be permitted as it will result in delamination.
- 3.2.8 Application Thickness

Minimum thickness of the topping shall be 1 (one) inch. Measurements will be taken prior to topping installation and reported to the Buyer for approval.
- 3.2.9 Floor Flatness
 - 3.2.9.1 Adjacent to embed tubes the topping shall be screeded flush to the top of the embeds. The surface shall be such that there will be no more than a +/- 1/16" deviation from a 24 inch long straightedge placed anywhere on the topping surface.
 - 3.2.9.2 The topping on the remainder of the operating floor shall be such that there shall be no more than a 1/8" depression below a 10 foot long straightedge placed anywhere on the surface.
- 3.2.10 Finish

Hard or burnished trowel finish. Avoid blistering.
- 3.2.11 Curing

Immediately following final finishing, two coats of membrane forming curing compound shall be applied.
- 3.2.12 Control Joints

Saw cut control joints as soon as the surface permits the weight of the saw without causing the topping edges to ravel. Spacing of the control joints should mirror the existing construction joints of the base concrete slab. Maximum control joint spacing shall be

twenty feet on center in each direction. Fill joints with control joint filler once the topping is fully cured.

3.3 FIELD QUALITY CONTROL

3.3.1 Testing

Submit cubes (2 inch x 2 inch x 2 inch) of fully cured samples to laboratory for testing to assure that characteristics comply with minimum requirements specified. Samples shall be cast at time of topping placement. Two samples shall be sent to the laboratory and one sample shall be retained at the site.

3.3.2 Field Service

Manufacturer of topping shall provide trained representative during periods of critical installation. A minimum of 5 days advance notice shall be given to the manufacturer prior to the initial use of the product.

3.4 ADJUSTMENTS

3.4.1 Repairs

Repair damaged or improperly installed or finished surfaces using the topping materials specified for the original work, in accordance with written recommendations of the topping manufacturer as reviewed by the Buyer.

3.5 CLEANING

The cleaning of surfaces not intended or designated to receive topping system shall be prompt and in accordance with the manufacturer's written instructions.

3.6 PROTECTION

3.6.1 Surfaces and Fixtures

Remove, mask, or otherwise protect surfaces and fixtures not intended to receive topping.

3.6.2 Equipment

Protect working parts of mechanical and electrical equipment from damage during surface preparation and topping process.

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3.6.3 Drains

Drains shall be plugged during installation of metallic topping to ensure that topping does not enter drainage system. All gratings, if any, shall be removed prior to topping application.

3.6.4 Traffic Control

Individuals not essential for installation of the metallic topping will not be permitted in areas during application and until surface has cured.

3.6.5 Post-Installation Protection

Topped surfaces shall be protected with plywood, mineral board, or similar material after cure against damage by others in or over the area.

3.6.6 Other Trades

Protect work of other trades against damage. Correct damage by cleaning, repairing, or replacing, and retopping as directed by the Buyer. Leave work in undamaged condition.

3.6.7 Signs

Provide "Fresh Concrete" signs to protect finished installation.

3.6.8 Protective Wrappings

After topping application, remove temporary protective wrappings provided by others for protection of their work during topping installation.

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 03200
CONCRETE REINFORCEMENT
B-595-C-E350-03200

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
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WAPA YES ☐ NO ☒
QUALITY LEVEL I ☒ II ☐
SAFETY CLASS 1 ☒ 2 ☐ 3 ☐ 4 ☐

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M. S. Whitten
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7/8/93
Date

SECTION 03200
CONCRETE REINFORCEMENT
B-595-C-E350-03200

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**SECTION 03200
CONCRETE REINFORCEMENT**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for the furnishing, installation, and testing of reinforcing steel for cast-in-place concrete.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 301 1989 Specification for Structural
Concrete for Buildings

ACI SP-66 1988 ACI Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A370 1990 (Rev. A) Standard Test Methods and
Definitions for Mechanical Testing
of Steel Products

ASTM A615 1990 Standard Specification for Deformed
and Plain Billet-Steel Bars for Concrete
Reinforcement

1.3 RELATED REQUIREMENTS

Specification Section 03300 Cast-In-Place Concrete

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Shop fabrication and placement drawings prepared in accordance with ACI SP-66.

These drawings shall indicate bar sizes, spacings, locations and quantities of reinforcing steel, bending and cutting schedules, supporting and spacing devices, as well as complete placing information such as the required concrete cover and the location of splices and construction joints.

1.6.2 Certified Material Test Reports (CMTRs) documenting the conformance of all materials as specified in Paragraph 2.1.1.

1.6.3 Documentation of the material tests specified in Paragraph 2.2.7.

1.6.4 Documentation of the performance tests, specified in Paragraph 2.1.2.3, verifying the performance of bar splices made with mechanical connectors.

1.6.5 Splice procedures developed according to Paragraph 2.1.2.4 to be used in making bar splices with mechanical connectors.

1.6.6 Documentation of the qualification of each person involved in making a bar splice with a mechanical connector per Paragraph 2.1.2.5.

1.6.7 Inspection reports documenting that bar splices made with mechanical connectors, as required in Paragraph 3.2.2.3 were made in compliance with the approved splicing procedures by qualified splicers.

1.6.8 Documentation of inspection required in Paragraph 3.3.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

(Not Used)

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Reinforcement

2.1.1.1 Reinforcing Steel: ASTM A615, Grade 60; deformed billet steel bars, plain finish.

2.1.2 Mechanical Connectors

2.1.2.1 Mechanical connectors for splicing reinforcing steel shall be Lenton taper threaded rebar splices by Erico Products or equal. Mechanical connectors shall have compatible accessories for mounting flush to formwork including internal coupler protectors and external bar end protectors.

2.1.2.2 Mechanical connectors shall develop in tension or compression at least 125 percent of the specified yield strength of the reinforcing steel.

2.1.2.3 Mechanical connectors for each bar size and splice type to be used in construction shall be qualified for use based on the following performance tests:

- A. Static Tensile Strength Tests - Six splice specimens of the bar-to-bar connection for each bar size and grade shall be subjected to tensile strength tests in accordance with ASTM A370 test methods. Conduct a tensile strength test on an unspliced specimen from the same bar used for the spliced specimen to establish the actual yield and tensile strength of each bar.

All test specimens shall meet the requirements of Paragraph 2.1.2.2. Each individual test report on both the spliced and unspliced specimens shall include at least the following information:

- 1) Yield strength
- 2) Tensile strength
- 3) Total elongation
- 4) Load-elongation curve or data up to failure load
- 5) Mode of failure.

The gauge length for each pair of spliced and unspliced specimens shall be the same, and equal to the length of the splice sleeve plus one to three bar diameters at each end.

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- B. Cyclic Tests - Three splice specimens of the bar-to-bar connection for each bar size and grade shall be subjected to 100 cycles of tensile stress variations from 5 percent to 90 percent of the specified minimum yield strength of the reinforcing bar. One cycle is defined as an increase from the lower load to the higher load and return.

The specimens shall withstand the cyclic test without loss of static tensile strength capability when compared with like specimen in A. above and tested statically to failure following cyclic tests.

- 2.1.2.4 Procedures for producing a splice shall be developed by the manufacturer of the mechanical connector and shall include, as a minimum, the following information:

- A. Procedures used for performance tests
- B. Type of equipment and methods used to verify bar thread acceptability
- C. Cleanliness requirements
- D. Type of equipment and methods used for torquing
- E. Required torque, tolerance on required torque, and method of measurement
- F. Method used to lock the coupling in place to prevent loosening of the splice
- G. Method used to verify the final alignment and engagement of the splice coupler on both bars

- 2.1.2.5 Personnel (splicer) involved in the production of the splices shall be trained and qualified to follow the procedures developed per paragraph 2.1.2.4 prior to performing any production splices. Qualification shall be documented and shall be in accordance with the following:

- A. Splices shall be made using reinforcing bars identical to that to be used in construction
- B. Each splicer shall prepare two sample splices on the largest bar size to be used in construction
- C. Subject each completed splice to a static tensile test. See Paragraph 2.1.2.3A for acceptance requirements.

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2.1.3 Accessory Materials

2.1.3.1 Tie Wire: Minimum 16 gauge, black, annealed type.

2.1.3.2 Chairs, bolsters, bar supports, dobies, spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

2.1.3.3 Special chairs, bolsters, bar supports, spacers adjacent to weather exposed concrete surfaces: Plastic coated steel type; size and shape as required.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Fabricate concrete reinforcing steel in accordance with the standard fabricating tolerances in ACI SP-66 and to the dimensions shown on the Contract Drawings.

2.2.2 All reinforcement shall be bent cold.

2.2.3 Store reinforcing steel off the ground and protect from oil or other deleterious materials.

2.2.4 Rust, seams, surface irregularities, or mill scale shall not be cause for rejection, provided the weight and height of deformations of a hand-wire-brushed test specimen are not less than the applicable ASTM specification requirements.

2.2.5 Tag bundles of reinforcing bars and mechanical couplers showing quantity, grade, size, and suitable identification to allow checking, sorting and placing; use embossed metal tags.

2.2.6 Mechanical couplers and bar threads shall be protected from damage during shipping, handling and installation.

2.2.7 Tension tests of reinforcing steel shall be provided in accordance with ASTM A615 for each 50 tons of each bar size produced from each heat of steel.

PART 3 EXECUTION

3.1 PREPARATION

Clean reinforcement to remove loose rust and mill scale, earth, ice and other materials which may reduce or destroy the bond with the concrete.

3.2 **INSTALLATION, APPLICATION AND ERECTION**

3.2.1 **Placement**

3.2.1.1 Place, support and secure all reinforcement to prevent displacement from its required position. Reinforcement placing tolerances shall meet the requirements of ACI 301 Chapter 5. Bars shall be tied securely to prevent displacement and all dowels shall be securely held in place prior to depositing concrete.

3.2.1.2 When necessary to move reinforcing bars to avoid interference with other reinforcement, conduits, or embedded items exceeding the specified placing tolerances, the resulting arrangement of bars shall be subject to acceptance by the Buyer.

3.2.1.3 Splice reinforcement as indicated on the approved placement drawings.

3.2.1.4 Do not displace or puncture the vapor barrier.

3.2.1.5 Accommodate placement of formed openings.

3.2.1.6 Do not field bend reinforcing bars partially embedded in concrete, except as shown on the placement drawings or when permitted by the Buyer.

3.2.1.7 Maintain concrete cover around reinforcing as specified on the placement drawings.

3.2.2 **Mechanical Connectors**

3.2.2.1 Mechanical connectors for splicing reinforcing steel shall be placed and tightened in accordance with the splicing procedures of Paragraph 2.1.2.4 by personnel trained and qualified per Paragraph 2.1.2.5.

3.2.2.2 Internal coupler protectors and external bar end protectors shall not be removed until a mechanical connection is ready to be made.

3.2.2.3 All splices made with mechanical connectors shall be inspected to verify that installation is in compliance with the approved production splicing procedures.

3.2.2.4 Field testing of completed connections is not required.

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3.3 **FIELD QUALITY CONTROL**

The Buyer will conduct shop and/or field inspection to ascertain that the materials, fabrication, testing and installation of the reinforcing steel and mechanical connectors conform to the requirements of this specification section.

3.4 **ADJUSTMENT**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 03252
CONCRETE ANCHORS
B-595-C-E350-03252

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☒ II ☐
SAFETY CLASS 1 ☒ 2 ☐ 3 ☐ 4 ☐

ORIGINATOR:

CHECKER:

R. S. Gruber 7/8/93
R. S. Gruber, Structural Engineer Date

E. Jorgensen 7-8-93
E. Jorgensen, Structural Engineer Date

APPROVED BY:

M. S. Whitten Lead Discipline Engineer
for M. S. Whitten

7/8/93
Date

SECTION 03252
CONCRETE ANCHORS
B-595-C-E350-03252

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**SECTION 03252
CONCRETE ANCHORS**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for the furnishing and installation of concrete anchors. Concrete anchors are considered to be:

- A. Anchor bolts installed in fresh concrete,
- B. Drilled anchors installed in hardened concrete.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A36/A36M	1990 Standard Specification for Structural Steel
ASTM A123	1989 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153	1982 (R 1987) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	1990 Standard Specification for Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength
ASTM A563	1991 Standard Specification for Carbon and Alloy Steel Nuts

1.3 RELATED REQUIREMENTS

Specification Section 03600 Grout

1.4 DEFINITIONS

(Not Used)

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1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Certified Material Test Reports (CMTRs) documenting the conformance of all materials as specified in Paragraph 2.1.1.

1.6.2 Documentation of inspection and testing required in Paragraph 3.3.

1.6.3 Copy of the current International Conference of Building Officials (ICBO) evaluation report, as required in Paragraph 2.1.2.3, documenting the allowable loads of the drilled anchor.

1.6.4 Copy of the manufacturer's printed instructions for the installation of drilled anchors per requirements of Paragraph 3.1.1.

1.6.5 Documentation of personnel qualification as specified in Paragraph 3.1.1.3.

1.6.6 Records of rebar cutting as specified in Paragraph 3.2.3.3.

1.7 **CLASSIFICATION OF SYSTEMS AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

(Not Used)

PART 2 PRODUCTS

2.1 **MATERIALS AND EQUIPMENT**

2.1.1 **Anchor Bolts**

An anchor bolt assembly shall consist of a bolt threaded at both ends supplied with 2 heavy hex nuts (one for each end), unless noted otherwise on the Contract Drawings, conforming to the following requirements:

Anchor Bolts	-	ASTM A307 Grade C, or A36
Heavy Hex Nuts	-	ASTM A563 Grade A

2.1.2 Drilled Anchors

2.1.2.1 Drilled anchors shall be carbon steel Kwik Bolt-II manufactured by Hilti Inc. or equal unless specified otherwise on the Contract Drawings.

2.1.2.2 Drilled anchors shall be provided as a complete assembly including the nut, and shall include all components necessary for the complete installation of the anchor.

2.1.2.3 Drilled anchors shall have a current International Conference of Building Officials (ICBO) evaluation report. The evaluation report shall indicate the allowable working shear and tension loads for each size and embedment of anchors installed in 4000 psi concrete, and the minimum spacing and edge distance required.

2.1.2.4 Drilled anchors shall have a length identification system that allows the determination of the length of an anchor without its removal.

2.1.3 Sleeves

Sleeves for anchor bolts shall conform to the requirements specified on the Contract Drawings.

2.1.4 Galvanized Anchor Bolts

When specified on the drawings, galvanized anchor bolts and nuts shall be hot-dip galvanized in accordance with ASTM A153.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Fabricate anchor bolts to the dimensions and details shown on the Contract Drawings. All anchor bolt and nut thread engagement shall be checked prior to shipment or installation.

2.2.2 Anchors bolts shall be bundled and tagged showing quantity, grade, size and suitable identification to allow checking, sorting and proper placement in the field; use embossed metal tags.

2.2.3 Fabricate sleeves to the dimensions and details shown on the Contract Drawings.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Drilled Anchors

3.1.1.1 Review the manufacturer's printed instructions and the current ICBO Evaluation Report for the drilled anchors selected for use on this project, the Contract Drawings and this specification section prior to commencing the installation of any drilled anchors. Resolve any conflicts with the Buyer.

3.1.1.2 The manufacturer's representative shall attend on-site meetings to assure that all the installation procedures are in accordance with the manufacturer's instructions and as modified by the applicable ICBO Evaluation Report. The representative shall remain at the jobsite until the Buyer is assured that the correct installation procedures are being followed. The Buyer shall be advised if the manufacturer's representative recommends anything contrary to this specification section.

3.1.1.3 Personnel assigned to install drilled anchors shall be trained and qualified to follow the procedures in paragraph 3.1.1.2 prior to installing any drilled anchors.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 General

3.2.1.1 Location of concrete anchors, anchor quantity, anchor diameter and anchor type shall be as shown on the Contract Drawings.

3.2.1.2 Relocation of a concrete anchor from the position shown on the Contract Drawings shall require the approval of the Buyer.

3.2.1.3 Welding to concrete anchors is not allowed except tack welding of the bottom nut as shown on the Contract Drawings.

3.2.2 Anchor Bolts

Install anchor bolts in cast-in-place concrete in accordance with the details and tolerances indicated on the Contract Drawings.

3.2.3 Drilled Anchors

3.2.3.1 Install anchors in hardened concrete after it has attained a compressive strength of 4,000 psi.

3.2.3.2 Drill holes in concrete and install anchors in accordance with the manufacturer's installation instructions, ICBO evaluation report and this specification section.

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3.2.3.3 When drilling holes for the installation of drilled anchors the Seller shall take precautions, such as using rebar detector or relocating anchors up to 2 inches from the specified location, to minimize cutting of rebars. Some cutting of the rebar is expected and will be permitted with Buyer approval. Records of cut rebars indicating location and quantity shall be submitted to the Buyer.

3.2.3.4 Set and torque anchors in accordance with the manufacturer's installation instructions as modified by the applicable ICBO Evaluation Report.

3.2.3.5 Unused or abandoned holes shall be filled with non-shrink cement-based grout conforming to Specification Section 03600, Grout.

3.3 FIELD QUALITY CONTROL

3.3.1 Inspection

3.3.1.1 The Buyer will conduct shop and/or field inspections to ascertain that the material, fabrication and installation of all concrete anchors conform to the requirements of this specification section.

3.3.2 Drilled Anchor Testing

3.3.2.1 A minimum of 10 percent of the installed anchors for each diameter shall be tension tested.

3.3.2.2 Anchors shall be tensioned to one and one-half times the allowable tension values indicated in the appropriate ICBO evaluation report.

3.3.2.3 Tested anchors shall be considered acceptable if during testing the concrete did not spall, the anchor did not break, the anchor did not migrate more than 1/8 inch, and the anchor did not become loose. If any anchor in a group assembly is not acceptable, all other anchors in the group shall be tested. The Seller shall notify the Buyer of any anchors that failed the test and the proposed remedial action.

3.3.2.4 Tension test reports shall include, as a minimum, the date of test; description of tested anchor(s), including location, equipment/support number, diameter, and manufacturer; description of tension test procedure, including equipment used and rate of loading; and pertinent observations regarding acceptance criteria.

3.4 ADJUSTMENTS

(Not Used)

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
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Fluor Contract 8457

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- 3.5 **CLEANING**
 (Not Used)
- 3.6 **PROTECTION**
 (Not Used)
- 3.7 **DEMONSTRATION**
 (Not Used)
- 3.8 **SCHEDULES**
 (Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 03300
CAST-IN-PLACE CONCRETE
B-595-C-E350-03300

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859 AND
OTHER MINOR CHANGES
ISSUE DATE 8/4/93

WAPA YES NO X
QUALITY LEVEL I X II
SAFETY CLASS 1 X 2 3 4

ORIGINATOR:

CHECKER:

R. S. Gruber 7/30/93
R. S. Gruber, Structural Engineer Date

E. Jorgensen 7/30/93
for E. Jorgensen, Structural Engineer Date

APPROVED BY:

M. S. Whitten
M. S. Whitten Lead Discipline Engineer

7/30/93
Date

SECTION 03300
CAST-IN-PLACE CONCRETE
B-595-C-E350-03300

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**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for installation, inspection and testing of cast-in-place concrete for buildings and appurtenances as shown on the Contract Drawings.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 301	1989 Specification for Structural Concrete for Buildings
ACI 304R	1989 Guide for Measuring, Mixing, Transporting and Placing Concrete
ACI 305R	1989 Hot Weather Concreting
ACI 306R	1988 Cold Weather Concreting
ACI 347R	1988 Guide to Formwork for Concrete
ACI SP-4	1989 Formwork for Concrete

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM D994	1982 Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
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1.3 RELATED REQUIREMENTS

Specification Section 03010	Metallic Topping
Specification Section 03200	Concrete Reinforcement
Specification Section 03252	Concrete Anchors
Specification Section 03362	Insulating Concrete
Specification Section 05120	Structural Steel

Specification B-595-A-A900 Ready-Mixed Concrete Production and Delivery

Specification B-595-A-A910 Inspection and Testing Services

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Concrete placement schedule per Paragraph 3.2.4.2.

1.6.2 Jobsite records of placed concrete per Paragraph 3.2.4.6 and documentation of inspection per Paragraph 3.3.3.

1.6.3 Documentation of testing as defined in Paragraph 3.3.2.

1.7 **CLASSIFICATION OF SYSTEM AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

(Not Used)

PART 2 PRODUCTS

2.1 **MATERIALS AND EQUIPMENT**

2.1.1 Concrete

2.1.1.1 Concrete shall be mix design classes from Table 1 of Specification B-595-A-A900, Ready-Mixed Concrete Production and Delivery. Use mix design classes as specified on the Contract Drawings.

2.1.1.2 Concrete for underground duct banks shall be Mix Design Class M. The top surface of all underground duct banks shall be colored red. The color may be applied by sprinkling red iron oxide powder over freshly poured concrete at the rate of 0.1 pounds per square foot of concrete surface, or painting the surface after concrete has hardened and cured.

2.1.2 Reinforcement

Reinforcement shall be in accordance with Specification Section 03200, Concrete Reinforcement.

2.1.3 Concrete anchors

Concrete anchors shall be in accordance with Specification Section 03252, Concrete Anchors.

2.1.4 Insulating concrete

Insulating concrete and anchor assemblies shall be in accordance with Specification Section 03362.

2.1.5 Steel embedments

Steel embedments shall be in accordance with Specification Section 05120, Structural Steel.

2.1.6 Concrete Sealer/Hardener

Concrete sealer/hardener shall be colorless, transparent, non-film forming chemical liquid that penetrates into the concrete, reacting with the alkali and lime to lock the pores and densify the concrete into a solid mass. Sealer/hardener shall be applied in accordance with the manufacturer's written recommendations. Ashford Formula, manufactured by Curecrete Company, Inc., or approved equal. It shall be applied to the concrete floors as indicated on the Contract Drawings.

2.1.7 Joint Filler

Joint filler shall be bituminous impregnated fiberboard, 1/2 inch and 1 inch thick in accordance with ASTM D994, installed in accordance with the Contract Drawings.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

- 3.1.1 Obtain pre-placement inspection and authorization from the Buyer before proceeding with concrete placement.

- 3.1.2 Prior to placing concrete verify that all reinforcing steel including concrete cover, anchor bolts and other embedded items are accurately placed and secured in accordance with the Contract and Fabrication Drawings.
- 3.1.3 Construction joints shall be as shown on the Contract Drawings and prepared in accordance with ACI 301, Section 6.1 and Section 8.5. Modify Section 6.1.4.3 as follows: Roughen the concrete surface uniformly to a full amplitude of approximately 1/4 inch in a manner that will remove laitance, loosened aggregate or damaged concrete at the surface.
- 3.1.4 Remove laitance and concrete splatter from protruding reinforcing steel after each concrete placement.
- 3.1.5 All equipment for transporting concrete shall be clean and free of hardened concrete. Do not use equipment made of aluminum or aluminum alloys to mix, handle, convey or place concrete.
- 3.1.6 All debris and ice shall be removed from spaces to be occupied by concrete. Concrete shall not be cast against any frozen surface.
- 3.1.7 Forms shall be properly coated and prepared in accordance with Section 4.4 of ACI 301. Form release agents or sealers shall be water base type.
- 3.1.8 Reinforcement shall be clean of ice, earth, loose rust and mill scale or other deleterious coatings.
- 3.1.9 Standing or puddled water shall be removed from place of deposit before concrete is placed.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Formwork

- 3.2.1.1 Formwork design and installation shall be in accordance with ACI 301, Chapter 4, ACI 347R and ACI SP-4. Form exposed corners of structures and foundations with a one inch by one inch chamfer unless noted otherwise on the Contract Drawings.
- 3.2.1.2 Do not remove forms and shoring used to vertically support the weight of concrete until the concrete has reached a minimum compressive strength of 4000 psi. For the concrete vault operating floor, in order to maintain the specified camber between successive placement of concrete, the shoring at midspan (high point) of each cell shall not be removed until the entire floor is constructed and has attained a minimum compressive strength of 4000 psi.

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- 3.2.1.3 Do not remove forms and shoring used to laterally support the weight of concrete until the concrete has reached a minimum compressive strength of 2000 psi.
- 3.2.1.4 The concrete shall be presumed to have attained the specified strength for form removal when the requirements of ACI 301, Section 4.7 have been met.
- 3.2.1.5 Do not remove forms used for curing before the expiration of the required curing period.
- 3.2.1.6 Remove temporary attachments to embedded items such as lifting pads, erection brackets and alignment mounts by machining or grinding. Restore surfaces of the embedded items to the original condition by grinding or by welding followed by grinding.
- 3.2.2 Placing Reinforcement

Place reinforcement in accordance with Specification Section 03200, Concrete Reinforcement.
- 3.2.3 Placing Concrete Anchors

Place concrete anchors in accordance with Specification Section 03252, Concrete Anchors.
- 3.2.4 Placing Concrete
 - 3.2.4.1 Place concrete in accordance with ACI 301, Chapter 8, except as modified by the supplemental requirements herein.
 - 3.2.4.2 Prepare concrete placement schedule for each concrete pour for Buyer's approval. The schedule shall address the following items:
 - A. Pour number
 - B. Extent of pour, plan and elevation views
 - C. Volume of concrete
 - D. Reference to concrete mix class and applicable submitted reinforcing steel placing drawings
 - E. Location of all embedded items such as plates, frames, pipe sleeves, inserts, conduits, anchor bolts and construction aids
 - F. Openings
 - G. Construction joint preparation and surfacing

H. Materials and methods of curing

I. Formwork removal timing and sequence

- 3.2.4.3 Concrete conveying by pumping shall meet the requirements of ACI 304R, Chapter 9. Concrete conveying by belt conveyors shall meet the requirements of ACI 304R, Chapter 10.
- 3.2.4.4 When the ambient air temperature is below 40°F or expected to be below 40°F within 24 hours thereafter of concrete placement, the provisions of ACI 306R shall be followed.
- 3.2.4.5 When the ambient air temperature is above 90°F or expected to be above 90°F at time of concrete placement, the provisions of ACI 305R shall be followed.
- 3.2.4.6 Maintain a jobsite record of placed concrete. Record date, time, location, quantity, air temperature, concrete temperature, delivery slip number and cylinder sample numbers.
- 3.2.4.7 After concrete placement and form removal, clean exposed reinforcing steel and embedded items of concrete splatter, dirt and other foreign matter.
- 3.2.4.8 Concrete that has achieved initial set or has been contaminated by foreign materials shall not be deposited in the structure. Retempered concrete shall not be used.
- 3.2.4.9 The Canister Storage building concrete vault foundation slab, walls and the operating floor shall be treated as massive concrete and provisions of ACI 301 Chapter 14, Paragraph 14.4 for placing shall apply.
- 3.2.5 Concrete Finishing
 - 3.2.5.1 Finish formed surfaces in accordance with ACI 301, Chapter 10, except as modified by the supplemental requirements herein.
 - 3.2.5.2 All formed surfaces which remain visible or exposed to public view shall have a "smooth form finish."
 - 3.2.5.3 Finish or prepare the concrete floor surface receiving the metallic topping in accordance with Specification Section 03010, Metallic Topping.
 - 3.2.5.4 Formed surfaces exposed to earth, receiving insulating concrete or not exposed to public view may have a "rough form finish."

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- 3.2.6 Slabs
 - 3.2.6.1 Construct slabs at grade in accordance with ACI 301, Chapter 11, except as modified by the supplemental requirements herein.
 - 3.2.6.2 Slabs shall have a "trowelled finish" and be finished to a "Class A Tolerance," unless noted otherwise on the Contract Drawings.
 - 3.2.6.3 Finished slab elevations shall be within plus or minus three-sixteenths of an inch of the specified elevation unless noted otherwise on the Contract Drawings.
- 3.2.7 Curing and Protection
 - 3.2.7.1 Cure and protect concrete in accordance with ACI 301, Chapter 12, except as modified by the supplemental requirements herein.
 - 3.2.7.2 For massive concrete as defined in Paragraph 3.2.4.9, cure and protect concrete in accordance with ACI 301, Chapter 14, Paragraph 14.5.
 - 3.2.7.3 Concrete surfaces not in contact with forms can utilize any of the methods indicated in ACI 301, Section 12.2.1, for preservation of moisture.
 - 3.2.7.4 Type of curing compound used shall be compatible with the final topping, coating or finish materials specified on the Contract Drawings and finish schedules.
 - 3.2.7.5 The concrete floor surface receiving the metallic topping shall not be cured with curing compounds. Curing shall be with methods using water only.
- 3.2.8 Patching

Repair of surface defects shall be performed only with the approval of the Buyer and shall be performed in accordance with ACI 301, Chapter 9.
- 3.2.9 Control Joints

Crack control joints including joint filler material and sealant shall be as defined on the Contract Drawings and installed per manufacturer recommendations.
- 3.2.10 Insulation Concrete

Insulating concrete material and application shall conform to the requirements of Specification Section 03362, Insulating Concrete.

3.3 FIELD QUALITY CONTROL

3.3.1 General

Prior to the placement of any cast-in-place concrete, the Seller shall meet with the Buyer and a representative from the concrete production facility designated by the Buyer, and a representative from the testing agency designated by the Buyer. The responsibilities of each party shall be fully discussed and procedures shall be developed for ordering concrete, for gathering, handling and transporting required concrete samples to the testing agency, and for submittal of the test results and placement records to the Buyer. The Seller shall provide labor to assist in the gathering, handling and transporting of concrete for testing by the Buyer's testing agency.

3.3.2 Testing

3.3.2.1 The Buyer will be responsible for the field testing of concrete to determine that it is in conformance with this specification section and the Contract Drawings. Concrete testing is defined in Specification B-595-A-A910, Inspection and Testing Services, Paragraph 3.2.2 and below:

- A. Tests for slump, air content and concrete temperature shall be made for the first delivery of each class of concrete each day and every 50 cubic yards thereafter.
- B. Tests for slump, air content, concrete temperature and unit weight shall be made for each strength test.
- C. At least one strength test shall be made per day for each class of concrete placed.
- D. For structures and foundations at least one strength test shall be made per 150 cubic yards or per 5000 square feet of surface area of slabs or walls, whichever is less.
- E. At least one strength test shall be made per 50 cubic yards of concrete for paving and slabs at grade.

3.3.3 Inspection

3.3.3.1 The Seller shall inspect reinforcing bar placement, concrete cover, formwork preparation and position of embedded items for compliance with the Contract Drawings prior to the placement of the concrete.

3.3.3.2 The concrete shall be inspected immediately upon the removal of the forms for honeycombs or embedded debris. Repair surface defects per Paragraph 3.2.8.

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3.3.3.3 The Buyer will conduct field inspections to ascertain that concrete work is performed in compliance with the requirements of this specification section and the Contract Drawings.

3.3.4 Evaluation and Acceptance

The evaluation and acceptance of the concrete work shall meet the requirements of ACI 301, Chapters 17 and 18.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 03362
INSULATING CONCRETE
B-595-C-E350-03362

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859 AND
 OTHER MINOR CHANGES
| ISSUE DATE 8/4/93

WAPA	YES	<u> </u>	NO	<u>X</u>
QUALITY LEVEL	I	<u>X</u>	II	<u> </u>
SAFETY CLASS	1	<u>X</u>	2	<u> </u>
	3	<u> </u>	4	<u> </u>

ORIGINATOR:

CHECKER:

<u>R. Gruber</u>	<u>7/30/93</u>	<u>E. Jorgensen</u>	<u>7/30/93</u>
R. Gruber, Structural Engineer	Date	for E. Jorgensen, Structural Engineer	Date

APPROVED BY:

M. S. Whitten
M. S. Whitten Lead Discipline Engineer

7/30/93
Date

SECTION 03362
INSULATING CONCRETE
B-595-C-E350-03362

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**SECTION 03362
INSULATING CONCRETE**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for installation of lightweight insulating concrete for wall and ceiling surfaces of the concrete canister storage vault as shown on the Contract Drawings.

The requirements, as set forth herein, for the application of insulating concrete, are minimum requirements which are in addition to, and supplement the requirements of the materials manufacturer and/or the installation contractor.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A193	1990 Standard Specification for Alloy Steel and Stainless Steel Bolting Material for High-Temperature Service
ASTM A580	1991 Standard Specification for Stainless and Heat-Resisting Steel Wire
ASTM C113	1987 Standard Test Method for Reheat Change of Refractory Brick
ASTM C133	1984 Standard Test Methods for Cold Crushing Strength and Modulus of Rupture of Refractory Brick and Shapes
ASTM C134	1988 Standard Test Methods for Size and Bulk Density of Refractory Brick and Insulating Firebrick
ASTM C401	1991 Standard Classification of Alumina and Alumina-Silicate Castable Refractories
ASTM C417	1986 Standard Test Method for Thermal Conductivity of Unfired Monolithic Refractories

ASTM C862	1987 Standard Practice for Preparing Refractory Concrete Specimens by Casting
ASTM C903	1988-E1 Standard Practice for Preparing Refractory Concrete Specimens by Cold Gunning
ASTM D512	1989 Standard Test Method for Chloride Ion in Water
ASTM E228	1985 (R 1989) Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer

1.3 **RELATED REQUIREMENTS**

(Not Used)

1.4 **DEFINITIONS**

Anchor: Shall mean metallic anchors to secure insulating concrete to structural concrete walls and ceiling.

Reinforcing: Shall mean metallic reinforcing used to improve cohesive strength of insulating concrete.

Installation Instructions: Shall mean product manufacturer's instructions, guidelines, and recommendations for the specified product installation. Guidelines and recommendations for improved product performance shall be considered to have the same importance as instructions.

1.5 **SYSTEM DESCRIPTION**

The reinforced concrete vault is approximately 140' x 165' x 45' deep. It is designed to store sealed vitrified radioactive waste filled canisters. Access to the canister storage tubes is by a shielded canister transporter through shielding plugs in the operating floor above the vault. Decay heat from the canisters is wasted to the atmosphere by a passive, convection driven cooling system. The canisters are cooled by a passive convection driven system, hot-face temperatures are cyclic seasonally and daily.

The insulating concrete is required to reduce thermal gradients and to maintain the peak temperatures to less than 200°F within the structural concrete. The insulating concrete is required on the bottom of the operating floor slab adjacent to the shielding plug sleeves, on both surfaces of the interior vault walls adjacent to the canisters and on the interior surfaces of the exterior vault walls adjacent to the canisters.

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The vault will be loaded with canisters uniformly over time, reaching its full capacity in 5 years. The design life of the canister storage vault is 40 years.

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

- 1.6.1 Material test and inspection reports for all insulating concrete materials to demonstrate compliance with Paragraphs 2.1.1, 2.1.2, 2.2.2, 2.2.3, 2.2.4 and 3.3.
- 1.6.2 Plan and elevation views showing extent of insulating concrete, anchor location, reinforcing, insulating concrete thicknesses and dimensional tolerances.
- 1.6.3 Anchor and Joint Details.
- 1.6.4 Procedure Specification for Installing Anchors.
- 1.6.5 Statement of the insulating concrete materials to be used in the project, including specific jobsite storage requirements. The stainless steel reinforcing proposed shall be identified by type, size, and manufacturer.
- 1.6.6 Installation instructions which detail the sequence, methods and dimensional checks used to assure that the insulating concrete installation meets the requirements of this specification section and Contract Drawings. The instructions shall include as a minimum:
 - 1.6.6.1 Methods used to avoid insulating concrete lamination, voids, and rebound entrapment.
 - 1.6.6.2 Joint Construction Methods.
 - 1.6.6.3 Methods for gauging, trimming and maintaining insulating concrete thicknesses.
 - 1.6.6.4 Methods for Curing the Installed Insulating Concrete.
 - 1.6.6.5 Methods and frequency of cleaning and maintaining the gunite equipment.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

Site Elevation: 714 feet above sea level
Outside Design Temperatures: -27°F to +115°F

1.9 DESIGN REQUIREMENTS

Insulating concrete, reinforcing, anchors, and joints shall be designed to the following conditions:

1.9.1 Design life of the insulating concrete shall be 40 years without any allowance for repairs and/or maintenance.

1.9.2 The normal and peak hot face operating temperatures are as follows:

Vault ceiling: Normal 200°F, Peak 270°F
Vault walls: Normal 150°F, Peak 200°F

1.9.3 Insulating concrete surface will be subject to cooling air flowing at a velocity of 19 feet per minute (fpm). Cooling air is unfiltered air flowing into the vault from an elevation of 40 feet above the surrounding grade.

1.9.4 Location, extent, thickness and details of insulating concrete shall be as shown on the Contract Drawings.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Insulating Concrete

The installed insulating concrete shall be ASTM C401 Class N Lightweight Refractory and meeting the following physical properties and performance requirements:

Manufacturer's Recommended Use Limit	Min 1600°F
Modulus of Rupture ASTM C133, Dried at 220°F	Min 80 psi
Bulk Density ASTM C134, After drying at 220°F to 230°F	Max 60 pcf
Cold Crushing Strength ASTM C133, Dried at 220°F	Min 300 psi
Permanent Linear Change ASTM C113, Dried at 220°F	Max 0.4%

Thermal Conductivity
ASTM C417, Mean Temperature of 400°F;
Samples shall be tested with Stainless
Steel Fiber

Max 1.70 Btu-
Inch/(Hr*Ft²*F)

Stainless Steel Fiber

2% by weight

- 2.1.2 Potable water to mix insulating concrete material shall not contain more than 50 ppm of chloride as CL ions as determined by ASTM D512.
- 2.1.3 The anchor assembly consists of an anchor bolt embedded in the structural concrete and a "V" type anchor embedded in the insulating concrete as detailed on the Contract Drawings. The anchor rod and nut shall conform to the requirements of ASTM A193, Grade B8, Type 304. The "V" type anchor shall conform to ASTM A580, Type 304.
- 2.1.4 The ends of the anchor arms shall be coated with mastic or plastic. The coating shall extend no more than 1/2" from the anchor tip towards the anchor foot. The attachment of the coating to the anchor tips shall be such that the coating will not loosen during the placement operations.
- 2.1.5 Reinforcing material shall be Type 304, melter extracted stainless steel fibers and shall be 3/4 inch long, 0.015 to 0.020 inch diameter.
- 2.1.6 Curing compound shall be non-flammable, non-toxic, resin type and contain a pigment to allow visual inspection of the coating. The compound shall be placed on all hydraulic setting material, including specimens being tested and production insulating concrete.

2.2 FABRICATION AND MANUFACTURE

- 2.2.1 Point-of-manufacture testing shall consist of one "Test Set" per each batch or each 10,000 pounds of material manufactured, whichever requires the greatest number of tests. The material to be tested shall be randomly sampled from the batch.
- 2.2.2 The Test Set shall be prepared at the point of manufacture in accordance with ASTM C862 for castable insulating concrete and ASTM C903 for gunnable insulating concrete to assure the quality of the insulating concrete material prior to shipment. A copy of the report documenting the preparation and testing of the test specimens shall be submitted to the Buyer.
- 2.2.3 Each Test Set shall have the following number of specimens and shall be tested in accordance with the following applicable ASTM test method.

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Number of Specimens	Description
1	ASTM C113, Reheat Change
3	ASTM C133, Cold Crushing
1	ASTM C133, Modulus of Rupture
1	ASTM C134, Density
Deleted	

The specimens shall be prepared and mixed using the same general procedures as the production material. No special procedures shall be utilized to enhance the properties of the material.

- 2.2.4 Prior to production nine test sets shall be prepared from three batches of material. Each batch shall include the reinforcing stainless steel fibers and shall be prepared and mixed using the same general procedures as the production material. In addition to the tests specified in the test set of Paragraph 2.2.3, each set shall include one test of thermal conductivity per ASTM C417.

PART 3 EXECUTION

3.1 PREPARATION

All work shall be coordinated with the Buyer, considering schedule, storage areas and interferences.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Surface Preparation

All structural concrete surfaces shall be cleaned free of surface laitance and all foreign material such as oil, grease, form release agent, curing compound, etc. Sand blasting and water blasting are acceptable methods of surface preparation.

The insulating concrete for the operating floor may serve as a forming surface for the structural concrete above.

At the time of insulating concrete installation, all structural concrete surface pores shall be water saturated but without free surface water.

3.2.2 Anchor Installation

Anchor length within the insulating concrete shall be at least 80% of the insulating concrete thickness. The length shall be adjusted so that the tip of the anchor is $\frac{1}{2}$ to 1 inch from the hot face of the insulating concrete.

Anchors shall be installed in a staggered pattern at spacing indicated on the Contract Drawings.

3.2.3 Application

3.2.3.1 General

- A. Before start of the insulating concrete work, a meeting shall be held at the job site between the manufacturer's technical representative, the installation contractor and the Buyer to review the preparation, mixing and installation instructions and resolve any conflicts.
- B. The Seller shall obtain pre-placement inspection and authorization from the Buyer prior to application of insulating concrete material.
- C. All insulating concrete material shall be transported and stored in a dry, weather tight structure. Material shall be stored on an elevated platform off the floor. To prevent ground moisture from creating any problems, the top of the platform should be covered with heavy polyethylene film before storing the insulating concrete. All material shall be stored between 50°F and 100°F.
- D. No material shall be used that is more than four (4) months old nor for which three months have elapsed from the time of "point-of-manufacture" testing. Any bag suspected of hydration shall be opened and inspected prior to mixing. The bag shall be discarded if hydration is noted.
- E. The water content, pre-wetting time, mixing time and temperature, and insulating concrete installation shall be per installation instructions and documented.
- F. All mixing and gunite equipment shall be clean and placed as close to the application area as possible. Spare parts shall be maintained at the work site to ensure minimal down time.
- G. A paddle-type mixer shall be used to mix the insulating materials. Concrete mixers which operate on the principle of a drum with lifting vanes rotating on a horizontal axis which require excess water to permit material flow are not acceptable. Hand mixing of insulating concrete materials, except for patch work, is prohibited. Mixer must be clean and free from portland cement or any other type of cement prior to use.

- H. The structural concrete surface temperature shall be maintained between 50°F and 100°F during application and for a minimum of 24 hours following concrete placement.
- I. The amount of material mixed at one time shall be limited to the amount of material which can be placed within 20 minutes or sooner but prior to initial set taking place. Any material which has begun its initial set shall be discarded immediately and in no circumstances shall it be reused.
- J. Stainless steel fibers may be introduced into the mixer along with or immediately following the introduction of the dry insulating concrete material, but before the addition of any mixing water. The fibers must be introduced in a manner which will ensure uniform distribution throughout the insulating concrete mix. Metal fibers shall be added using a "shaker box". This box shall have a bottom screen with openings of $\frac{1}{2}$ inch by $\frac{1}{2}$ inch.
- K. To prevent differential expansion spalling between the insulating concrete and the operating floor plug shells, bond breaker shall be used on the plug shells. Bond breakers shall be considered for use wherever applicable.

3.2.3.2 Poured or Cast Insulating Concrete

- A. Forms shall be non-absorptive, rigidly constructed and water tight to prevent excessive leakage. The surfaces in contact with the insulating concrete shall be uniform, smooth and coated with a form release agent. Forms shall be designed and constructed to support the estimated weight of the material as mixed and to facilitate removal without damage to the insulating concrete.
- B. Excessive troweling or floating of the surface of a cast-in-place application is not allowed.
- C. Unless otherwise stated in the installation instructions, mixing water shall be between 40°F and 80°F. Steam or ice may be used to control water temperature.
- D. "Pouring Nozzles" may be used to install the insulating concrete. Caution must be exercised to ensure proper mixing of water at the nozzle. The nozzle operator shall be pre-qualified prior to material application. The manufacturer's requirements for pre-dampening shall be used.
- E. Pouring procedures shall minimize the possibility of segregation of materials. Free fall of the material shall be kept to a minimum. Drop chutes may be used. Immersion vibration shall not be permitted.

- F. Excessive water which migrates to the top of each castable pour shall be removed.

3.2.3.3 Gunite Application

- A. Materials used for gunning shall be specifically prepared for and shall be certified by the material suppliers as being suitable for pneumatic placement.
- B. Continuous inspection shall be provided during all insulating concrete application.
- C. The dry gun method shall be used. Insulating concrete material shall be pre-wetted in the mixer to reduce rebound losses and dusting in accordance with installation instructions. Pre-dampened insulating concrete materials must be installed within thirty (30) minutes of the addition of pre-dampening water.
- D. Unless otherwise noted in the installation instructions, insulating concrete material pressure at the nozzle should be 20 to 30 PSI.
- E. Sufficient compressed air and water pressure shall be provided to ensure satisfactory application. Unless otherwise noted in the installation instructions, the water pressure at the nozzle should be about 10 PSI higher than the air pressure.
- F. If wet or dry surges occur, the affected area shall be cut out, anchors cleaned, and insulating concrete re-applied immediately.
- G. All nozzle operators shall be pre-qualified.
- H. Under no circumstances shall rebound material be re-used. All rebound material shall be discarded as soon as possible.
- I. "Down hand gunning" shall not be allowed. If application requires insulating concrete to be placed in the down position, a pouring application shall be used. The area should be cleaned of all rebound.
- J. Insulating concrete shall be gauged during application to ensure required thicknesses are met. Cut back shall be done as soon as possible after application. Gage holes shall be sealed.
- K. Insulating concrete thickness tolerances shall be minus 0 to plus 1/2 inch.

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- L. Gunitite application shall start from the lowest portion of the insulating concrete and proceed up. Caution shall be taken to ensure all anchors are clean of over-spray and rebound material. An air lance shall be continuously used to clean rebound and overspray from completed surfaces, anchors and adjacent areas.
- M. Construction joint or cold joints shall be the full thickness of the insulating concrete and trimmed to an angle of 90° to the wall. Curing compound shall not be used on any joints. If initial set has taken place, all joints shall be dampened prior to continuing application.
- N. Where interruptions exceeding twenty (20) minutes occur in the application of a layer, the insulating concrete shall be cut back perpendicular to the wall where it has been applied to full thickness and at a point midway between anchors. The edge shall be scored after cutting, and thoroughly wetted before application of the adjacent insulating concrete.
- O. Shot boards shall be used on vertical or horizontal joints as required. Caution shall be taken to ensure no rebound entrapment occurs.

3.2.4 Curing

Placing of insulating concrete shall be scheduled when ambient temperatures are expected to be between 50°F and 100°F for the first 24 hours after the placement.

Curing compound shall be spray applied on all the exposed surfaces of the insulating concrete within 30 minutes of application.

Installed insulating concrete shall not be allowed to freeze prior to dryout. Dryout of the insulating concrete shall be in accordance with the manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

3.3.1 Seller's Application Procedure

Prior to the beginning of production installation, the Seller shall qualify each nozzleman by applying the specified insulating concrete to a simulated mockup of the application. Minimum size of the mockup shall be 3' x 3' and conditions of application shall be identical to the production insulating concrete application including anchors.

After mockup is allowed to set for 24 hours a section of the application shall be cut from the test piece and sawed into the required test specimen sizes. They shall be tested in accordance with the Test Set defined in Paragraph 2.2.3. The remainder of the mockup panel shall be broken into pieces to inspect for the uniform distribution of steel reinforcing fibers, absence of voids and rebound pockets and sound application around the anchorage. Test and inspection reports shall be submitted to the Buyer.

The Buyer shall approve the production methods and each nozzleeman by this procedure prior to production installation.

3.3.2 Production Testing

Production testing shall be performed during installation of actual production insulating concrete.

For insulating concrete applied by gun method, one Test Set shall be taken twice a shift, on the first half of the shift and one in the second half of the shift. They shall be gunited at the same location as the production insulating concrete. The sample box sizes shall be 3' x 3'. They shall be allowed to set and shall be carefully removed to a covered location simulating the production insulating concrete temperatures. After 24 hours they shall be cut to the required sizes and tested in accordance with the Test Set defined in Paragraph 2.2.3. The remainder of the test panel shall be broken into pieces to inspect for the uniform distribution of steel reinforcing fibers, absence of voids and rebound pockets and sound application. Test and inspection reports shall be submitted to the Buyer.

For insulating concrete applied by cast method, one Test Set shall be taken for every 10,000 pounds of material poured. The Test Set shall be taken at the location of the pour, stored for 24 hours and tested in accordance with the Test Set defined in Paragraph 2.2.3.

3.3.3 Inspection of Anchor System

Anchors shall be inspected visually for correct locations.

3.3.4 Production Inspection

3.3.4.1 Records shall be kept for each batch of material and shall include, but not be limited to the following:

- A. Quantities of dry insulating concrete and water
- B. Mixing time
- C. Temperature range of dry material, water and mixed materials

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D. Type of mixer used

E. Method of distribution of metal fibers

3.3.4.2 The physical inspection of the insulating concrete shall be done visually and with a hammer. If visual inspection reveals voids, soft areas or excessive cracking, these areas shall be repaired immediately. A hammer test shall be performed on insulating concrete to locate hidden voids and soft spots.

3.3.5 Retesting

The Buyer has the right to specify retest method and accept or reject any re-tested material regardless of test results. Retesting of a rejected material will be limited to one re-test only and limited to the portion of failure. If the sample fails during the re-test, the batch shall be rejected.

3.3.6 Repair of Defective Areas

Unacceptable sections of insulating concrete shall be chiseled out at right angles to the surface. The sound area adjacent to the repair area shall be completely pre-wetted with potable water prior to the application of the replacement insulating concrete. If no anchor is found in the repair area, or additional anchors are deemed necessary by the Buyer, new anchors shall be added prior to the insulating concrete installation.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457


SECTION 03600
GROUT
B-595-C-E350-03600

APPROVED FOR CONSTRUCTION

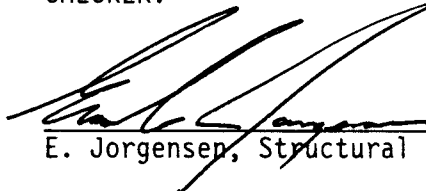
REVISION 1 PER CR-0859
ISSUE DATE 8/1/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☒ II ☐
SAFETY CLASS 1 ☒ 2 ☐ 3 ☐ 4 ☐


ORIGINATOR:


R. S. Gruber, Structural Engineer Date 7/8/93

CHECKER:


E. Jorgensen, Structural Engineer Date 7-8-93

APPROVED BY:

for 
M. S. Whitten Lead Discipline Engineer

Date 7/8/93

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SECTION 03600
GROUT
B-595-C-E350-03600

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**SECTION 03600
GROUT**

PART 1 GENERAL

1.1 SUMMARY

This Section covers the technical requirements for the furnishing, installation and inspection of nonshrink cement-based grout for use in the installation of equipment, structural steel column bases and other appurtenances as shown on Contract Drawings.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM C109	1990 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
ASTM C191	1982 Standard Test Method for Time of Setting of Hydraulic Cement by VICAT Needle
ASTM C827	1987 Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

CORP OF ENGINEERS

CRD-C621	1983 Specification for Nonshrink Grout
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1.3 RELATED REQUIREMENTS

(Not Used)

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Submit manufacturer's installation instructions, detailed product data sheets, supporting test data and material safety data sheets for the manufactured grout.

1.6.2 Documentation verifying that the material conforms to the requirements specified in Paragraph 2.1.2.

1.6.3 A copy of the grout placement record per Paragraph 3.2.3.

1.6.4 Documentation verifying the nonshrink properties of the grout materials delivered to the jobsite specified in Paragraph 3.3.2 and for any retesting per Paragraph 3.3.3.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

Maintain temperature of foundation, baseplate and grout between 40°F and 90°F, as measured by surface thermometer, during grouting and for a minimum of 24 hours following grouting.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Nonshrink cement-based grout shall be a premixed, properly preproportioned, factory packaged and ready-to-use product consisting of a patented mixture of cement, sand and inert materials. The amount of water added to the premixed dry product shall be in strict accordance with the manufacturer's printed instructions. This, in turn, must yield the quantity of nonshrink grout specified.

2.1.2 Nonshrink cement-based grout shall be Five Star Grout by U.S. Grout Corp. or equal and shall meet the following minimum requirements:

A. Minimum compressive strength of 5000 psi at 28 days when tested in accordance with ASTM C109.

B. Plastic Volume Change - No shrinkage (zero percent) and a maximum of 4 percent expansion when tested in accordance with ASTM C827.

- C. Hardened Volume Change - No shrinkage (zero percent) and a maximum of 0.4 percent maximum expansion in the hardened state when tested in accordance with CRD-C621.
 - D. A minimum initial set time of 60 minutes when tested in accordance with ASTM C191.
 - E. Shall not contain metallic particles such as aluminum powders or iron filings, or expansive cement.
 - F. Shall be free of chemically produced gas, oxidizing catalysts, inorganic accelerators, including chlorides and shall be nonstaining.
- 2.1.3 The manufacturer shall provide technical service as required for mixing and installation.
- 2.1.4 Potable water shall be used in mixing and curing the grout. Use the minimum amount of water necessary for proper installation. Temperature of mixing water shall not exceed 80°F.
- 2.1.5 Store and handle grouting materials in accordance with the manufacturer's printed instructions.
- Nonshrink cement-based grout shall be delivered to the jobsite in sound, dry bags. All grout material shall be stored in a dry and weatherproof shelter.
- Do not use grouting materials remaining in storage for more than six months, unless retested and found to comply with the provisions of this specification or unless a longer shelf life is indicated by the manufacturer.
- Cement-based grouting materials which have become damp or air-set shall not be used.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

- 3.1.1 Concrete surfaces to be grouted shall have cured for a minimum of seven days prior to surface preparation.
- 3.1.2 Concrete surfaces shall be roughened by chip hammering, sand blasting or other mechanical means to assure bond of grout to concrete. The surface shall be clean, with all laitance, ice,

frost, grease, oil, dirt or loosened aggregate removed prior to setting leveling plates.

3.1.3 Set and anchor all leveling plates and embedments to the proper line and elevation. The number and type of leveling plates shall be determined in accordance with the recommendations of the equipment manufacturer and other contract documents.

3.1.4 Metal surfaces in contact with the grout shall be clean and free of oil and grease, and other foreign substances. The presence of tightly bonded paint is acceptable.

3.1.5 Concrete surfaces on which nonshrink cement-based grout is to be placed shall be thoroughly soaked with water for 24 hours. Just prior to grouting, the water shall be removed leaving only a damp film. All standing water shall be removed from anchor bolt sleeves.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Review the grout manufacturer's printed instructions for mixing and installation accompanying the material selected for use on this project, the Contract Drawings, the installation instructions given on vendor equipment drawings, and this specification prior to commencing any grouting. Resolve any conflict among these with the Buyer.

3.2.2 Form work shall be provided for grout and shall be compatible with the placement method. Forms shall be designed for rapid, continuous and complete filling of space to be grouted. Forms shall be strong, securely anchored, and shall be caulked or sealed with tape to prevent leakage. Coat forms with form oil or heavy wax to prevent grout adherence and absorption.

Design forms to be at least 1-inch clear of base plate or equipment base; top of form to be a minimum of 1 inch above the bottom of the adjacent base plate.

3.2.3 Maintain a record for all grout placement including date, time, location, quantity, daily air temperature, concrete temperature, mixing method and method of curing.

3.2.4 Mix grout in a paddle-type mortar mixer or other suitable mechanical mixer as recommended by the manufacturer. Do not mix by hand or use a concrete mixer.

Mixing equipment shall be thoroughly free of oil, grease or other deleterious substances. Washout mixer with clean water, empty out water, leaving mixer wet. Before mixing a subsequent batch of grout, wash out any left over grout from preceding batch. Retempering of leftover grout is not allowed.

Mix grout adjacent to the area being grouted; have sufficient manpower and equipment available for rapid and continuous mixing and placing. Do not mix the grout longer than the time recommended by the manufacturer. Mix grout only in quantity that can be placed within the working time of the grout.

- 3.2.5 Place the grout quickly and continuously to avoid the undesirable effects of overworking which may cause segregation, bleeding or premature initial set.
- 3.2.6 Grout may be dry packed, flowed or pumped into place with proper manufacturer's instructions.
- 3.2.7 For equipment bases, place flowable grout only along one side and through a flume or lead box mounted on the formwork in a manner which minimizes trapped air and bubble formation. The use of vibrators to increase the placability of the grout is not permitted. The use of steel straps to move grout into position is permitted. Chaining is not permitted because of air-entrainment between the links. Continue placing of grout until it oozes out along the entire perimeter and fills up through every interior vent and grout hole.
- 3.2.8 Finish and cure in strict accordance with the manufacturer's printed instructions. Protect grout from extreme drying conditions by covering exposed grout surfaces with continually wetted burlap or waterproof paper for a minimum of three days following grouting. Protect grout from cold and hot weather in accordance with requirements as specified by the manufacturer.

3.3 FIELD QUALITY CONTROL

- 3.3.1 Before grouting, a manufacturer's technical representative shall be called for a pregrouting conference to review grouting steps and manufacturer's instructions with those actually doing the grouting. The representative shall remain at the jobsite as long as required to ensure correct procedures are being used and that manufacturer's warranty is not in jeopardy. The Buyer shall be advised if the manufacturer's representative recommends materials or procedures contrary to this specification section.
- 3.3.2 The Buyer shall verify the nonshrink properties of the grout when the first shipment arrives at the site. Two 6 inch x 12 inch concrete test cylinders shall be filled with the mixed grout, screened off, and a baseplate with anchor bolt holes, placed on top of one cylinder. The uncovered cylinder shall be placed on top of the baseplate simulating the restraint of machinery. After 14 days, the top cylinder shall be removed. If the grout is nonshrink, it shall have risen over the top edge of the top cylinder. When an attempt is made to lift the plate from the lower cylinder, the plate shall be found to be bonded to the

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grout. If either of these situations do not occur, the grout shall be rejected.

3.3.3 Tests shall also be conducted on grout material remaining in storage over 6 months for conformance to the minimum requirements of Paragraph 2.1.2.

3.4 **ADJUSTMENT**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 05120
STRUCTURAL STEEL
B-595-C-E350-05120

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859 AND CR-0884
| ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☒ II ☐
SAFETY CLASS 1 ☒ 2 ☐ 3 ☐ 4 ☐

ORIGINATOR:

CHECKER:

R. S. Gruber 7/30/93
R. S. Gruber, Structural Engineer Date

E. Jorgensen 7/30/93
E. Jorgensen, Structural Engineer Date

APPROVED BY:

M. S. Whitten
M. S. Whitten Lead Discipline Engineer

7/30/93
Date

SECTION 05120
STRUCTURAL STEEL
B-595-C-E350-05120

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SECTION 05120 STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

This Section covers the technical requirements for the furnishing, fabrication, delivery, erection and inspection of structural steel and miscellaneous metal including steel roof deck.

1.2 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC S302	1986 Code of Standard Practice for Steel Buildings and Bridges
AISC S329	1985 Allowable Stress Design Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts
AISC M016	1989 Manual of Steel Construction - Allowable Stress Design, Ninth Edition

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A36/A36M	1990 Standard Specification for Structural Steel
ASTM A53	1990 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A108	1990 Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
ASTM A123	1989 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153	1982 (R 1987) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

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ASTM A242	1989 Standard Specification for High Strength Low-Alloy Structural Steel
ASTM A307	1990 Standard Specification for Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength
ASTM A325	1990 Standard Specification for High-Strength Bolts for Structural Steel Joints
ASTM A446	1989 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A500	1990 Standard Specification for Cold-Formed Welded and Seamless Structural Tubing in Rounds and Shapes
ASTM A525	1991 (Rev. A) Standard Specification for General Requirements for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process
ASTM A563	1991 Standard Specification for Carbon and Alloy Steel Nuts
ASTM A588	1988 Standard Specification for High-Strength Low-Alloy Structural Steel with 50 KSI (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM F436	1990 Standard Specification for Hardened Steel Washers

FEDERAL SPECIFICATIONS (FS)

RR-G-661E	1987 Grating, Metal, Bar Type (Floor, except for Naval Vessels)
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STEEL DECK INSTITUTE (SDI)

SDI Design Manual	1989 Design Manual for Composite Decks, Form Decks, and Roof Decks; Publication No. 27
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1.3

RELATED REQUIREMENTS

Specification Section 05060	Welding Structural
Specification Section 09900	Painting

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Specification Section 03300 Cast-In-Place Concrete

Specification Section 03600 Grout

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Certified Material Test Reports (CMTRs) demonstrating material conformance to all the noted ASTM requirements identified in Paragraph 2.1.1 through 2.1.5 and 2.2.

1.6.2 Catalog data for shear stud connectors, or other data published by the manufacturer, demonstrating conformance to the specified requirements.

Catalog data indicating deck profile characteristics, dimensions, structural properties, and finishes. Catalog figure numbers alone will not suffice.

1.6.3 Checked shop and erection drawings meeting the requirements of Paragraph 2.2.1.1.

1.6.4 Bolt lists and summary sheets, meeting the requirements of Paragraph 2.2.1.2.

1.6.5 Documentation of all shop and field inspections conducted under Paragraph 3.3.

1.6.6 Documentation of all personnel qualifications required by the specifications referenced herein.

1.7 **CLASSIFICATION OF SYSTEM AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

(Not Used)

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

All materials shall be carbon steel unless noted otherwise on the Contract Drawings.

2.1.1 Carbon Steel Materials

2.1.1.1 Structural steel members (shapes, bars, and plate): ASTM A36 or where referenced on the drawings ASTM A242, Type 1 or ASTM A588, Grade A or B.

2.1.1.2 Structural tubing: ASTM A500, Grade B.

2.1.1.3 Pipe: ASTM A53, Type E or Type S, Grade B.

2.1.1.4 Shear stud connectors: Nelson Type S3L or H4L or equal conforming to ASTM A108 Grades C-1010 through C-1020 (low carbon cold drawn steel), with a minimum ultimate tensile stress capacity of 55,000 psi, automatic welded type.

2.1.1.5 Bolts: All bolts shall be 3/4 diameter high strength bolt assemblies, unless noted otherwise on the Contract Drawings. A bearing bolt assembly shall consist of a heavy hex head high strength bolt, a heavy hex nut and a hardened washer.

A common (machine) bolt assembly shall consist of a heavy hex head common bolt, a heavy hex nut and a hardened washer.

High Strength Bolts:	ASTM A325, Type 1, Plain
Common (machine) Bolts:	ASTM A307, Grade A
Hardened Washers:	ASTM F436
Heavy Hex Nuts for Common Bolts:	ASTM A563, Grade A
Heavy Hex Nuts for H.S. Bolts:	ASTM A563, Grade DH, Plain

2.1.1.6 Floor grating: Federal Specification RR-G-661E, Type I (parallel bearing bars with right angle cross members), Class I (welded), Material S (steel), with serrated surface and galvanized per ASTM A123. Bearing bars: 1-1/4 inch by 3/16 inch on 1-3/16 inch centers. Cross bars: 4 inch centers. End-banding bars: 1-1/4 inch by 3/16 inch.

2.1.1.7 Grating fasteners: minimum 1/8" thick by 1" wide saddle clip engaging two grating bearing bars, with minimum 1/4" stud, welded or self-tapping; all parts galvanized per ASTM A153.

2.1.1.8 Stair treads: Standard commercial product with nonslip nosings, conforming to the floor grating requirements above and galvanized per ASTM A123.

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- 2.1.1.9 Floor plates: Floor plate shall be skid resistant raised pattern carbon steel plate, 1/4 inch thick excluding the height of the raised pattern. The plate material shall have a minimum yield stress of 33000 psi.
- 2.1.1.10 Pipe handrail and pipe sleeves: ASTM A53, Schedule 40.
- 2.1.1.11 Paint and coatings: Specification Section 09900.
- 2.1.1.12 Weld materials: Specification Section 05060, Welding Structural.

Low hydrogen welding electrodes with a tensile strength of 70,000 psi. Electrodes shall be compatible with the welding process and materials being welded.

2.1.2 Metal Deck

- 2.1.2.1 Sheet Steel: ASTM A446, Grade C Structural Quality having a minimum yield strength of 40,000 psi, with G90 galvanized coating conforming to ASTM A525.

- 2.1.2.2 Metal Decking: LXR Type B as manufactured by Elixir Ind. or equal.

Span Design: Multiple

Minimum Metal Thickness: 20 Gauge

Nominal Height: 1-1/2 inch high fluted profile

Support and Side Joints: Per Contract Drawings

- 2.1.2.3 Provide all metal closure strips, flashings, touch-up paint and all related accessories required for the installation of steel deck.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Shop Detailing

- 2.2.1.1 Prepare shop and erection drawings. Include dimensioning, fabrication and erection details, connection details, methods of field assembly, mark numbers and bills of material. Clearly note field bolting and welding requirements.

- 2.2.1.2 Prepare a complete bolt list with summary sheets showing quantities required, sizes, lengths, grips and the members they connect. Temporary bolts used only for erection shall be listed separately. Paint heads of temporary bolts yellow.

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- 2.2.1.3 Each item detailed shall be provided with a unique identifier (mark number) which identifies the structure or building number, the fabricators detail sheet number and an individual piece designation number. Clearly show piece mark numbers on erection drawings.
- 2.2.1.4 Connections which are not detailed or otherwise noted on the Contract Drawings shall be shop welded and field bolted AISC framed beam connections as shown in Tables II and III of AISC M016, Part 4. Use the maximum number (n) of rows of field bolts compatible with the "T" dimension and flange cope for each beam depth under consideration. Use a 1/4 inch shop weld "A" and length of connection angle length "L" as shown in Table III for the required number of field bolts.
- 2.2.1.5 Bolted connections shall be made using a bearing bolt assembly and tightened to snug tight conditions as defined in AISC S329, Paragraph 8(c). Bolt threads need not be excluded from the shear plane.
- Do not omit primer from the contact surfaces of bolted connections. Omit finish paint from contact surfaces of all high-strength bolted connections.
- Bolt holes shall be 1/16" larger than the bolt diameter unless noted otherwise on the Contract Drawings. All connections shall have a minimum of 2 bolts.
- 2.2.1.6 Hold out to out dimensions exact for all continuous runs of beams to avoid accumulative errors.
- 2.2.1.7 Provide erection clips for fit-up of welded connections.
- 2.2.1.8 Gusset and stiffener plates shall be 3/8 inch thick minimum.
- 2.2.1.9 Columns shall have full bearing at splices and at end plates.
- 2.2.1.10 Cut or raw edges shall be rounded off and smooth to the touch.
- 2.2.1.11 Bends shall have a minimum radius equal to the thickness of the material.
- 2.2.1.12 Floor plates: Floor plate shall be provided with a 9/16 inch diameter drain hole for each 15 square feet of plate area. There shall be at least one drain hole per panel.

Joints in floor plates shall be as shown on the Contract Drawings.

Openings dimensioned on the Contract Drawings shall be detailed and provided in the fabrication shop.

- 2.2.1.13 Grating: Grating shall be removable unless otherwise specified on the contract drawings.

Clamps shall be supplied for the field installation of the grating. Two clamps per panel shall be used at each support with a minimum of 4 clamps per panel.

Joints in floor panels shall be located over supports.

Do not notch bearing bars at support to maintain elevation.

Openings dimensioned on the Contract Drawings shall be detailed and provided in the fabrication shop.

Banding shall be provided on all grating panels and for any penetrations.

Banding bars shall be of the same thickness as the bearing bars to which they are welded.

- 2.2.1.14 Metal deck: Cut units so that end joints will occur on supporting members. End joints shall overlap a minimum of 2 inches.

Include decking plan, support locations, projections, openings and reinforcement, pertinent details, mark numbers, and accessories. Indicate temporary shoring of decking where required.

- 2.2.2 Shop Fabrication

Do not begin shop fabrication until the shop and erection drawings have been reviewed and released for fabrication by the Buyer.

- 2.2.2.1 Fabrication of structural steel shall be in accordance with the requirements of the AISC S302, Sections 6.1 through 6.6, with the modifications and additional requirements specified hereinafter.

- 2.2.2.2 All fabricated steel shall be indelibly marked with the mark number shown on the shop drawings.

- 2.2.2.3 Shop welding, including welding qualification, process and preparation, shall be in accordance with Specification Section 05060, Welding Structural as applicable for carbon steel. Only visual examination of welds, in accordance with procedures specified in Paragraph 3.2.6.2 of Specification Section 05060 for statically loaded structures, is required unless noted otherwise on the Contract Drawings.

- 2.2.2.4 Shop priming shall be in accordance with Specification Section 09900, Painting.

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- 2.2.2.5 Prior to shop priming, all sharp corners, burrs (including bolt hole burrs), weld spatter, slag, weld flux, loose mill scale and other foreign matter shall be removed.
- 2.2.2.6 Primer shall be omitted within 2" of all field welds.
- 2.2.2.7 Primer not required on ASTM 242 or ASTM 588 steels.
- 2.2.3 Shipping
 - 2.2.3.1 Shipping lists shall accompany each shipment of steel, metal deck and other items.
 - 2.2.3.2 Cars and/or trucks shall be loaded and cribbed so they can be readily unloaded. The steel shall be protected from damage caused by shifting of steel during transit.
 - 2.2.3.3 The sizes of fabricated pieces shall be as large as practicable considering clearances and capacities of railroad cars or trucks between the fabricating shop and the jobsite.
 - 2.2.3.4 Small pieces shall be bundled with steel bands to prevent damage during shipment and to facilitate unloading.
 - 2.2.3.5 Shipping sequence shall be coordinated with field erection schedule.

PART 3 EXECUTION

3.1 PREPARATION

- 3.1.1 Prior to beginning field erection, the Seller shall review the erection drawings, verify receipt of required materials, and develop an erection plan. The erection plan shall take into account erection loads and provide sufficient temporary bracing to maintain the structure in a safe condition. The temporary bracing shall maintain the structure in a plumb and correctly aligned condition until erection has been completed.
- 3.1.2 Store structural steel members, in an area designated by the Buyer, aboveground on platforms, skids or other supports, in such manner that any deformation or damage of shapes, plates, etc., shall be avoided.

3.2 INSTALLATION, APPLICATION AND ERECTION

Erect structural steel in accordance with the requirements of the AISC S302, Section 7, with the modifications and additional requirements specified herein. Structural steel to be set on

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concrete shall not be erected until the concrete has attained the specified 28 day compressive strength.

- 3.2.1 Immediately report to the Buyer errors in shop work or errors in existing conditions that are discovered in the field. Do not take corrective action without approval by the Buyer.
- 3.2.2 Field weld components and shear studs as indicated on the erection drawings.
- 3.2.3 Bearing bolt assemblies shall be tightened to the snug tight condition as defined in AISC S329, Paragraph 8(c).

Do not use bolts or nuts whose threads have been visibly distorted.
- 3.2.4 Weld steel floor plates to steel supporting members except floor plates indicated as removable on the Contract or Erection Drawings.

Secure removable floor plates with flat head counter-sunk bolts or screws as indicated on the Contract Drawings.
- 3.2.5 Secure bar gratings with grating clamps. Use two clamps per panel at each support with a minimum of four clamps total per panel.
- 3.2.6 All field welding shall be performed in accordance with Specification Section 05060, Welding Structural, as applicable for carbon steel. Only visual examination of welds, in accordance with procedures specified in Paragraph 3.2.6.2 of Specification Section 05060 for statically loaded structures, is required unless noted otherwise on the Contract Drawings.
- 3.2.7 After erection, inspection and acceptance, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete in accordance with Specification Section 09900, Painting.
- 3.2.8 Seal weld all nail holes in embed plates.
- 3.2.9 Erect metal decking in accordance with SDI Design Manual and manufacturer's instructions, and the approved shop drawings.
- 3.2.10 Bear decking on steel supports with 3 inch minimum bearing. Align and level.
- 3.2.11 Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x 1/4 inch, steel angles. Place angles perpendicular to flutes and mechanically attach to deck at each flute. The angle shall extend a minimum of two flutes past the opening or to the main steel if closer.

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- 3.2.12 Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
- 3.2.13 Provide side joints as shown on the drawings.
- 3.2.14 Weld deck to steel supports as shown on the Contract Drawings. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with zinc chromate type touch-up primer after all loose slag and paint have been removed by power wire brush cleaning.
- 3.2.15 Grout under base plates with nonshrink cement based grout in accordance with Specification Section 03600, Grout.
- 3.2.16 Erection tolerances shall be in accordance with AISC S302, Section 7.11.
- 3.2.17 Paint in accordance with Specification Section 09900, Painting.
- 3.2.18 The Seller is responsible for the stability of the steel structure during erection.
- 3.3 **FIELD QUALITY CONTROL**
 - 3.3.1 The Seller shall develop an inspection system for the fabrication and erection of the structural steel and metal decking to assure conformance with the contract requirements. The Seller's quality control program and inspection system shall be submitted in writing to the Buyer for review. Records of inspection and certified reports of tests required shall be submitted to the Buyer. The Buyer shall be allowed complete access during fabrication and erection and shall be allowed to inspect all operations including welding and testing.
 - 3.3.2 The Seller shall be subject to shop and field inspection to ascertain the following:
 - 3.3.2.1 That all materials provided are properly documented with CMTR's as required.
 - 3.3.2.2 That all personnel involved in the fabrication, erection and inspection processes have been qualified in accordance with the appropriate specifications referred to herein.
 - 3.3.2.3 That the final installed structure is in accordance with the Contract Drawings.
 - 3.3.3 All bolted connections and shop and field welds shall be visually inspected.

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3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

(Not Used)

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07200
INSULATION
B-595-C-E350-07200

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES NO X
QUALITY LEVEL I II X
SAFETY CLASS 1 2 3 X 4

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

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J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 07200
INSULATION
B-595-C-E350-07200

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SECTION 07200 INSULATION

PART 1 GENERAL

1.1 SUMMARY

This section covers technical requirements for furnishing and installing batt or blanket type insulation in interior construction.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C177	1985 Test for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate
ASTM C665	1988 Standard Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction
ASTM E84	1989 (Rev. A) Test for Surface Burning Characteristics of Building Materials

1.2.1 Conflicting Requirements

In the event of a conflict between pertinent codes and regulations and the requirements of referenced standards of these specifications, the provisions of the more stringent shall govern.

1.3 RELATED REQUIREMENTS

Specification Section 09110	Metal Stud Framing System
Specification Section 09250	Gypsum Board

1.4 DEFINITIONS

(Not Used)

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Manufacturer's Catalog Data**

Complete descriptive literature of the proposed materials.

1.6.2 **Samples**

Sample of each material proposed with manufacturer's written descriptive labeling attached.

1.6.3 **Receiving Inspection Documents**

Submit receiving documents at the close of the contract.

1.6.4 **Field Quality Control**

Submit the procedure for visual inspection activities.

1.7 **CLASSIFICATION OF SYSTEM AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

(Not Used)

PART 2 PRODUCTS

2.1 **MATERIALS AND EQUIPMENT**

Shall conform to the referenced standards and to the requirements specified herein.

2.1.1 **Insulation Types**

A. **Thermal Insulation**

Unfaced fiberglass wool batts conforming to ASTM C665, Type 11, Class C. Thickness as required to meet R-11 as identified on drawings.

B. Sound (Acoustic) Insulation

Identical to product described under Thermal Insulation above.

2.1.2 Fire Hazard Test

Flame spread classification for insulation shall be no greater than 25, and smoke developed classification no greater than 50, in accordance with ASTM E84 tests.

2.1.3 Material Delivery, Storage and Handling

A. Packaging

Preparation for shipment and packing may conform to the manufacturer's standards and, as a minimum, shall provide protection against moisture, dirt, damage from normal handling and storage.

B. Delivery

Deliver insulation materials in manufacturer's original unopened protective packing.

C. Receiving Inspection

Inspect insulation materials for damage prior to acceptance and to be sure that items included in packing list have been supplied. Promptly report any damage, or any wet or soiled insulation to delivering carriers, manufacturers, and Buyer.

D. Storage and Handling

1) Reseal or repackage insulation materials after inspection and store in original protective packing or its equivalent.

2) Store in dry weatherproof area.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

- A. Inspect areas to be insulated.
- B. In the event that discrepancies exist in the framing or related items immediately notify the Buyer.

3.2 INSTALLATION, APPLICATION AND ERECTION

- A. Install wall insulation after one side of wall is closed in.
- B. Install insulation friction-fit between metal studs, in accordance with manufacturer's instructions.
- C. Fit insulation by butting the batts together. Close all voids in the sound or thermal barrier prior to application of final wall surface material.
- D. Coordinate with work of other interior construction trades.

3.3 FIELD QUALITY CONTROL

- 3.3.1 Upon completion of the installation, visually inspect each insulated area and verify that insulation work is complete and properly installed, in compliance with Contract Drawings and this specification.

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

On completion, remove all excess material and debris from the project site.

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

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Richland, Washington
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Advanced Technology Division
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3.8

SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
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Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07465
METAL WALL SYSTEM
B-595-C-E350-07465

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 07465
METAL WALL SYSTEM
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SECTION 07465
METAL WALL SYSTEM

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for designing, furnishing and installing the exterior insulated metal wall system.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A446/A446M	1989 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A525	1991 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements
ASTM C236	1989 Test for Steady State Thermal Performance of Building Assemblies by means of the Guarded Hot Box
ASTM C920	1987 Standard Specifications for Elastomeric Joint Sealants
ASTM D522	1988 Mandrel Bend Test of Attached Organic Coatings
ASTM D523	1989 Test for Specular Gloss
ASTM D968	1981 (R) Test for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM G23	1989 Operating Light-Exposure Apparatus (Carbon-Arc Type) with or without Water for Exposure of Nonmetallic Materials
ASTM D659	1986 Evaluating Degree of Chalking of Exterior Paints

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ASTM D2244	1989 Calculation of Color Differences from Instrumentally Measured Color Coordinates
ASTM E283	1984 Test for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors
ASTM E331	1986 Test for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Pressure Differences

FEDERAL SPECIFICATIONS (FS)

FS HH-1-558	1976 Insulation Blocks, Boards, Blankets, Thermal (Mineral Fiber Industrial Type)
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FEDERAL STANDARD (FED-STD)

FED-STD-595B	1989 Colors Used in Government Procurement
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INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

UBC (Chapter 23)	1988 Uniform Building Code
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SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-88	1988 Minimum Design Loads for Buildings and Other Structures
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1.3 RELATED REQUIREMENTS

Specification Section 08110	Metal Doors and Frames
Specification Section 08365	Telescoping Doors
Specification Section 07900	Sealants
Specification Section 07600	Flashing and Sheet Metals

1.4 DEFINITIONS

Where the phrase "or equal" occurs in the specifications, the use of alternative material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to authorization by the Buyer.

1.5 SYSTEM DESCRIPTION

An exterior metal wall system, consisting of exterior metal panels (two types), insulation, and interior metal liner panels, designed for field assembly and installation over structural girts.

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1.5.1 The metal wall system shall be designed to resist the wind loading as defined in ASCE 7-88. Wind parameters are: Basic wind speed 33 feet above ground of 70 mph, Importance Factor "I" = 1.07, Exposure Category "C". Maximum allowable deflection shall be $L/180$.

1.5.2 Metal wall system and its components shall be designed to resist earthquake forces calculated in accordance with UBC Chapter 23 utilizing the following site specific information:

Seismic Zone	=	2B
Importance Factor "I"	=	1.25
Site Coefficient "S"	=	1.2

1.5.3 Thermal Resistance Value (R-Value)

Walls: R-12.51 (Minimum)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Drawings

Shop drawings which shall show the size and location of openings and the location, length and markings of panel pieces to correspond with the sequence of installation and the size and placement of girts, supports and braces. Show accessories and the type and sequence of field connections. Show types and locations of fasteners. Provide details at openings including those for doors, louvers and penetrations, and at top, bottom and corner terminations. Clearly indicate flashing, trim and areas to receive sealant.

1.6.2 Design Calculations

- A. Manufacturer's design calculations for wall panels, shall be stamped and signed by a registered civil or structural engineer licensed in the state of Washington.
- B. Substantiate that wall assemblies and fastening design will withstand the specified seismic and wind loads acting uniformly over maximum indicated span, measured center to center of supports, without exceeding the maximum allowable unit stress based on actual thickness of metal and without exceeding specified deflections.

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1.6.3 Samples

- A. Submit sample of each type of material to be installed on the project including insulation, fasteners and sealants. Include complete technical data for each item.
- B. Submit color samples for metal panels identical to manufactured product.

1.6.4 Certified Material Test Reports

Submit certified copies of test reports from an independent laboratory on the performance of the wall system and components as required to meet this specification.

1.6.5 Certificates

Certify that materials comply with the specified standards.

1.6.6 Guarantees

- 1. Provide a 2 year guarantee warranting the weather tightness of the building.
- 2. Provide a 10 year manufacturer's warranty for finished surfaces against blistering, peeling, cracking, flaking, checkering, chipping, alligatoring, fading and discoloring.

1.6.7 Material Safety Data Sheets (MSDS)

Submit applicable MSDS for materials such as sealants that are delivered to the site. Include MSDS copies with delivered materials in addition to separate copies delivered to Buyer.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Site Elevation 714 feet above sea level
- B. Barometric Pressure 14.3 psia
- C. Outside Design Temperature
 - 1) Maximum Design Temperature 101°F
 - 2) Minimum Design Temperature 9°F
 - 3) Wet Bulb Design Temperature 68°F

- D. Wind Loads
As listed in 1.5.1.
- E. Seismic Loads
As listed in 1.5.2.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

The exterior metal wall system shall consist of exterior metal panels, glass fiber insulation, interior metal liner panels, and all accessories including clips, metal trim, coping, subgirts, fasteners, sealants and gaskets. The materials of E.G. Smith Construction Products are listed herein in order to establish a level of quality. Materials by other manufacturers are acceptable provided they meet the requirements of this specification and as approved by Buyer.

2.1.1 Exterior Metal Wall Panels

- A. Lower panels shall consist of roll formed galvanized steel panels, minimum 22 gauge, with 1-1/2" deep interlocking ribs 12" on center and 2 stiffening ribs equally spaced; "Trimwall" panels or equal.
- B. Upper panels shall consist of roll formed galvanized steel panels, minimum 22 gauge, 38-3/4" wide with 1-1/2" deep ribs 7.2" on center; "Style-Rib" panels or equal.

2.1.2 Interior Metal Liner Panels

Roll formed galvanized steel panels, minimum 24 gauge, 3" deep with factory caulked overlapping edges 24" on center and 5 stiffening ribs equally spaced; "V-Liner" panels or equal.

2.1.3 Panel Steel

Steel shall be structural quality conforming to ASTM A-446 Grade A with a hot dipped galvanized coating conforming to ASTM A-525 designation G-90. The exterior metal wall panels and trim shall have a nondirectional embossed pattern.

2.1.3.1 Panel Finish

- A. Exterior metal wall panels, flashing and trim pieces shall receive a factory applied polyvinylidene fluoride (PVF2) (minimum 70 percent Kynar-500 content) finish coat applied

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over a 0.2 mil baked on epoxy base primer to a total film thickness of 1.0 mil minimum. The PVF2 finish shall be protected with a strippable film; "Peelcote" or equal.

- 1) Primer Coats: Panel manufacturer's standard color.
- 2) Finish Coats: Federal Standard 595B; color shall be as noted on Contract Drawings.

B. The interior liner panel room side finish shall be in manufacturer's standard flat gloss polyester off-white finish, with minimum .5 mil nominal dry film thickness.

2.1.4 Subgirts

Form subgirts (hat or zee) shaped from galvanized steel in 18 or 16 gauge. Locate at each structural support and at intermediate locations as required to meet design loads.

2.1.5 Flashing, Trim and Coping

Formed from the same material and in the same finish and color as the exterior metal wall panel.

2.1.6 Fasteners

Electrolytically compatible self-tapping #14B point or self-drilling #12 TEKS for sheet-to-support as required by the design loads and the support thickness; and self-tapping #14A point or lap self-drilling TEKS for sheet-to-sheet attachment. Fasteners shall be complete with compression seals and washers, and exposed fasteners shall have painted heads to match the panels. Panel manufacturer shall provide complete design information on the fasteners with required submittals.

2.1.7 Expansion Joint Closures

Provide 6"-60 mil black neoprene bellows closure with .018" stainless steel flanges attached to each side of bellows. Flanges shall be of double metal construction and approximately 2 1/4" wide. Manville "Expand-O-Gard Style F" (vertical) or equal and "Expand-O-Flash Style EJ" or equal with prefabricated transitions.

2.1.8 Panel Closures

From closed cell pre-molded neoprene or sheet metal to fit the contour of the metal panels.

2.1.9 Dissimilar Metals

Dissimilar or electrolytically incompatible metals shall not be incorporated in the wall system.

2.1.10 Sealant

Low modules, one-component, moisture curing, modified polyurethane joint sealant conforming to ASTM C920 and suitable for gun application. (DYMONIC by Tremco, Cleveland, Ohio; or equal)

2.1.11 Sealant Tape

Void filling, 100 percent solids butyl based extruded sealant tape. (MBT-35 by Tremco, Cleveland, Ohio; or equal)

2.1.12 Insulation

Glass fiber boards complying with FS-HH-1-558 in thickness to achieve the thermal resistance R values specified, within a 3" deep liner panel. Insulation to have reinforced vapor retarder facing with overlapping edge tabs, and permeance of 0.02 perms maximum (Lamotite #2840-WMP vapor retarder by Lamotite, Cleveland, Ohio, or equal). The facing shall be installed towards the exterior surface of the metal wall system.

2.1.13 Performance and Tests

Tests by an independent laboratory shall have been performed upon a metal wall system as that proposed for this project. For air leakage and water penetration tests, tested panels shall have identical type joints as the proposed panels.

2.1.13.1 Structural

Metal wall system shall be capable of withstanding design wind loads and earthquake forces. Provide test results to substantiate pull-out and pull-over values in pounds for any fastener to be used.

2.1.13.2 Thermal Properties

Metal wall system shall provide a maximum "U" value of .079 BTU/hr/sq. ft/°F when corrected to a 15 mph wind condition, when tested in accordance with ASTM C-236.

2.1.13.3 Air Leakage

Air leakage through the metal wall system shall not exceed 0.06 cfm per square foot of wall area at a pressure differential of 1.56 pounds per square foot when tested in accordance with ASTM E283.

2.1.13.4 Water Penetration

There shall be no water leakage through the metal wall system at 6.24 psf air pressure differential, when tested in accordance with ASTM E331.

2.1.14 Exterior Finish Coating Tests

Finish coating shall be 100 percent free of any paint holidays, drip marks or roll marks that are visible at a distance of 5'-0" with sheets standing vertically, in a light producing a minimum of 200 foot candles three feet from floor. Independent laboratory tests verifying compliance with the following performance criteria shall be submitted for review and approval:

2.1.14.1 Formability Test

In accordance with ASTM D522, the finish coating system shall show no microchecking of the exterior film and no loss of adhesion, when subjected to a 180 degree bend over a 1/8 inch diameter mandrel.

2.1.14.2 Weathering Test

A sample of the finish coating system shall withstand the weathering test for a minimum of 2,000 hours in accordance with ASTM G23 without cracking, peeling, blistering, or loss of adhesion of the finish system or corrosion of the base metal. Any of the finish coating system that can be readily removed from the base metal with a penknife blade or similar instrument shall be considered as a loss of adhesion.

2.1.14.3 Chalking Resistance

After the 2,000 hour weathering test, the finish coating system shall not chalk greater than a No. 8 rating when measured in accordance with ASTM D659 test procedures.

2.1.14.4 Color Change

After the 2,000 hour weathering test, the finish coating system shall not show a color change greater than two NBS units when measured in accordance with ASTM D2244 test procedures.

2.1.14.5 Specular Gloss

The finish coating system shall have a specular gloss value of not more than ten at an angle of 85 degrees when measured in accordance with ASTM D523 test procedures for the colors selected from Federal Standard 595B.

2.1.14.6 Abrasion Resistance Test

The finish coating system shall withstand a minimum of 100 liters of falling sand before the appearance of base metal when tested in accordance with ASTM D968 test procedures.

2.1.15 Product Delivery, Inspection, and Storage

A. Delivery

Deliver metal panels and accessories in manufacturer's original protective packing.

B. Storage and Handling

- 1) Store metal panels and accessories in their original protective packing or equivalent.
- 2) Do not buckle, bend or mar metal panels.
- 3) Store off ground with one end elevated for drainage.
- 4) Cover metal panels materials with waterproof material ventilated to prevent condensation.

2.1.15.1 Labeling

Appropriately mark each crate or package exterior containing metal panels and accessories with ink, paint, or indelible material. Marking shall include: order number, destination and name of material. Show identification of type and quantity of material included in package on exterior of package. If material is shipped in several packages, note on packing list number of packages and contents of each package.

2.1.15.2 Packaging

- A. Preparation for packing and shipment may conform to manufacturer's standards and, as a minimum, shall provide protection against moisture, corrosion, as well as damage from normal handling and storage.

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B. Minimum preparation for shipping shall include:

- 1) Bracing, supports and rigging connections to prevent damage during shipment, lifting and unloading.
- 2) Protection for ends of metal panels to prevent bending or marking during normal shipping and handling.
- 3) Separate, loose pieces or closure pieces completely boxed and shipped with main metal panel shipment.

2.2 **FABRICATION AND MANUFACTURE**

All metal wall system components shall be manufactured off-site in controlled manufacturing facilities. All panel profiles shall be roll formed shapes to insure consistency in the profile dimensions. Panels fabricated by other means such as by press brake will not be allowed.

PART 3 EXECUTION

3.1 **PREPARATION**

3.1.1 Prior to installation of any metal panels, carefully examine installed structural steel and other framing to verify that such work is complete and inspected prior to commencing installation.

3.1.2 In event of discrepancy, promptly notify Buyer. Do not proceed with installation in areas of discrepancies until authorized by Buyer.

3.2 **INSTALLATION, APPLICATION AND ERECTION**

3.2.1 **Panels and Accessories**

Erect metal wall system with accessories in strict accordance with Buyer approved shop drawings, erection procedure, requirements of this specification and as follows:

A. **Tolerance**

Start all panels true. All horizontal joints shall be level, all vertical side joints plumb.

B. **Insulation**

Install insulation with vapor barrier side facing inward toward interior metal liner panels. Seal joints with vapor retarder tabs.

C. Expansion Joint Closures

Install expansion joint closure with both flanges set in continuous adhesive sealant or compressible preformed sealant tape.

D. Workmanship

Keep exposed surfaces and edges of metal panels clean and free from sealant, metal cuttings, hazardous burrs, and other foreign materials. Remove stained, discolored, or damaged panels from site.

E. Touch-Up

After erection is complete, touch-up scuffs and abrasions due to transportation and erection. Panel manufacturer to provide touch-up paint that will duplicate finish coat on panels.

3.2.2 Sealants

Install sealants per manufacturer's recommendations and the approved shop drawings.

3.2.3 Extra Stock

Upon completion of the metal wall system, deliver additional stock for use in building repairs. Additional materials shall be from the same production run as materials installed

- | | | |
|----|----------------------------------|-------------------------------|
| A. | Exterior metal panels | 4 20'-0" lengths of each type |
| B. | Interior metal liner panels | 4 20'-0" lengths |
| C. | Metal coping | 2 20' lengths |
| D. | Interior and exterior metal trim | 2 - 20' lengths |
| E. | Fasteners | 100 of each type and color |

3.3 FIELD QUALITY CONTROL

3.3.1 Construction acceptance inspection (by Seller)

Inspect installation for conformance with this specification, Contract Drawings and the following:

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- A. Verify that panels are installed plumb, square and true to line, and that all attachments are provided, as shown on approved shop drawings.
- B. Ensure that insulation, flashings, copings, filler strips, closures and other appurtenances are installed according to Contract Drawings and approved shop drawings.
- C. Visually inspect joints and other points where sealant or caulking has been applied to ensure that it has been applied without gaps or air pockets, as indicated on Contract Drawings and in accordance with this specification.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07500
MEMBRANE ROOFING SYSTEM
B-595-C-E350-07500

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0884 & CR-0859
ISSUE DATE 8/4/93

WAPA	YES	___	NO	<u>X</u>
QUALITY LEVEL	I	___	II	<u>X</u>
SAFETY CLASS	1	___	2	<u>X</u>
			3	<u>X</u>
			4	___

ORIGINATOR:

CHECKER:

S. C. Sam 7/29/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-29-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLD) 7-29-93
J. L. Datte Architectural Lead

7-29-93
Date

SECTION 07500
MEMBRANE ROOFING SYSTEM
B-595-C-E350-07500

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**SECTION 07500
MEMBRANE ROOFING SYSTEM**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installation of a fully adhered single ply membrane roofing system, including rigid insulation and roof walkway pads.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN PLYWOOD ASSOCIATION (APA)

APA E30 1987 APA Design/Construction Guide,
Residential and Commercial

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

ASTM D412-1987 Test Method for Rubber Properties in
Tension

ASTM D-1149 1986 Test Method for Rubber Deterioration,
Surface Ozone Cracking

ASTM D-2178 1989 Specification for Asphalt Glass Felt
for Roofing

ASTM E96 1990 Test Methods for Water Transmission
of Materials

ASTM G26 1990 Practice for Operating Light-Exposure
Apparatus (Xenon-Arc Type) with and
without Water for Exposure of Nonmetallic
Materials

FACTORY MUTUAL (FM)

Class 1 Fire Rated 1-90 Windstorm Rated

UNDERWRITERS LABORATORIES (UL)

--- 1992 Building Materials Directory
UL 790 1983 Test for Fire Resistance of Roof
Covering Materials

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA G-5-88 1988 Grading Rules for Western Lumber
(plus supplements)

1.3 RELATED REQUIREMENTS

Specification Section 01730 Operation and Maintenance Data
Specification Section 07600 Flashing and Sheet Metal
Specification Section 05120 Structural Steel

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and
Data Requirements section of the Order/Subcontract:

A. Materials List

Complete list of all materials to be provided.

B. Installation Methods

Submit manufacturer's recommended detailed installation
methods for materials specified in this specification.

C. Manufacturer's Literature

Provide manufacturer's literature setting forth
characteristics of insulation materials being supplied,
including R values, flame spread and smoke developed
classifications.

D. Shop Drawings

Submit complete shop drawings with roof plan and all related details. Show sheet layout and sizes, roof slope, fastener type and spacing, perimeter and penetration details.

E. Samples

Submit two samples of membrane, insulation, fasteners flashing and any and all accessories, including sealants, as directed.

F. Maintenance Manual

Submit maintenance manual containing detailed instructions for the care and repair of the roofing system in accordance with Specification Section 01730, "Operation and Maintenance Data", including a list of local service companies.

G. Material Safety Data Sheets (MSDS)

Submit applicable MSDS for all roofing materials delivered to the site. Include MSDS copies with delivered materials in addition to separate copies delivered to the Buyer.

H. Certification (Final)

Submit a certified statement that all rigid insulation, membrane roofing, flashing and roof walkway pads have been installed in strict accordance with manufacturer's printed instructions and this specification. Statement shall be signed and dated by a technical representative of the roofing manufacturer.

I. Warranty

Furnish the manufacturer's standard 10 year warranty for the membrane roofing system. Warranty shall provide that if within the warranty period, the roofing becomes non-watertight, splits, tears or becomes separated at the seams because of wind damage, defective materials or workmanship, the repair or replacement of defective materials and correction of defective workmanship shall be the responsibility of the membrane roofing sheet manufacturer. The warranty shall be a NDL (no dollar limit) warranty and shall be made directly to the Buyer by the membrane roofing sheet manufacturer.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Site Elevation 714 feet above sea level
- B. Barometric Pressure 14.3 psia
- C. Outside Design Temperature

- 1) Maximum Design Temperature 110°F
- 2) Minimum Design Temperature -20°F
- 3) Wet Bulb Design Temperature 68°F

- D. Snow Loads

Minimum snow load on roofs shall be 20 psf. The effects of snowdrifts shall be considered.

- E. Wind Loads

Basic wind speed at standard height of 33 feet shall be 70 mph. The wind loads shall be based on terrain exposure "C". The importance factor "I" shall be 1.07.

- F. Rainfall Intensity

Maximum of 1 inch in 24 hour period.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Use only UL listed and FM approved products. Roofing system shall meet requirements for a Factory Mutual Class 1 Fire Rated and 1-90 Windstorm Rated, and an Underwriters' Laboratories Class A rating. The roofing system listed herein is Carlisle Syntec Systems Design "A" fully adhered system, with 0.060 non-reinforced brite-ply E.P.D.M. membrane, in order to establish a level of quality. Other manufacturer's products are acceptable provided they meet the requirements of this specification and as approved by Buyer. The system shall consist of a single-ply roofing membrane over insulation boards. The roofing materials shall include insulation, fasteners, sealants, flashing, counter-flashing and all necessary components for a complete system. The membrane shall have a white upper surface and be a minimum 0.060 inches thick. Tensile strength shall be 1300 psi minimum per ASTM D412, and indicate no cracks or crazing per ASTM G-26 and ASTM D1149 tests.

2.1.1 Manufacture

All roofing system materials shall be provided by a single manufacturer of these materials.

2.1.2 Insulation Products

Insulation shall be rigid polyisocyanurate in thickness of 2.6", for R-19 insulation value. Carlisle Polyisocyanurate HP or equal.

2.1.3 Roof Walkway Pads

Provide roofing system manufacturer's recommended molded rubber type walkway pads or equal as indicated on the contract drawings.

2.1.4 Related Materials

Bonding adhesive, splicing cement, splice cleaner, lap sealant, in-seam sealant, water cut-off mastic, pipe flashing, pourable sealer, rubber fastening strips, and lay flat tubing shall be by the manufacturer of the roofing membrane.

2.1.5 Protective Board

Protective board laid directly over the roof insulation shall be 1/2" high density fiberboard. High Performance Recovery Board or equal. Locate where indicated on drawings.

2.1.6 Fasteners

Mechanical fasteners with 3" diameter plates shall be the type recommended by the manufacturer for the life of the installation. Mechanical fasteners shall penetrate through the substrate and provide resistance to wind suction pressure of 46.0 psf.

2.1.7 Deleted.

2.1.8 Material Delivery, Storage and Handling

- A. Deliver materials in original unopened containers, with manufacturer's labels intact and legible. Including MSDS data sheets. Store materials in a dry area, protected from sunlight, with controlled temperature between 60°F and 80°F.
- B. Inspect insulation and roofing materials for damage prior to acceptance and to be sure that items included in packing list have been supplied; and to assure that all applicable documentation required has been received and approved as required. Promptly report any damage or any missing components to delivering carriers, manufacturers, and the Buyer.

- 1) Reseal or repackage insulation and roofing materials after inspection and store in original protective packing or its equivalent.
- 2) Handle rolled goods to prevent damage to edges or ends.
- 3) Select and operate material handling equipment to prevent damage to existing construction or applied roofing.
- 4) Store roofing materials on clean raised platforms with weather protective covering when stored outdoors.
- 5) Store rolled goods on end.
- 6) Protect materials against damage by construction traffic.
- 7) Remove wet materials from project site.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

A. Pre-Installation Conference

Prior to commencement of the work, a pre-installation conference shall be convened and attended by all principals involved in or affected by the work, and shall include the manufacturer's technical representative.

B. Inspection

- 1) All surfaces to which insulation and single ply roofing is to be attached shall be examined to assure that their condition is satisfactory for application of the roofing system.
- 2) The work shall be coordinated with that of the other trades.
- 3) Roof decks shall be dry, clean, and free from cracks, holes and sharp changes in elevation, free from oil, grease, frost, snow, and foreign substances at the

time insulation, roofing materials, and sheet metal are applied.

- 4) All perimeter walls, roof penetrating components, and supports shall be in place prior to roofing. Insulation board surfaces shall be installed smooth and even, without broken or cracked boards.

C. Discrepancies

- 1) In the event of discrepancy, immediately notify the Buyer.
- 2) Do not proceed with application of single-ply roofing system in areas of discrepancy until authorized by the Buyer.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Insulation Application

- A. Rigid insulation board shall be mechanically fastened in accordance with the manufacturer's drawings. Cut and fit insulation tightly around all projections and walls. Joints between insulation sheets shall be staggered in a brick like pattern so there are no continuous seams.
- B. Install temporary water cutoffs at the end of each day to insure that water will not seep under the newly laid membrane and into the building.
- C. At all open areas and edges of single ply roof membrane construction, install treated wood blocks and nailers, thickness of insulation, to act as stops for the insulation and for nailing. Around vents, stacks and all other roof openings, provide treated wood nailers, secured in place for nailing metal flanges. Wood shall be Douglas Fir, Utility Grade in accordance with WHPA G-5-88; pressure treated with salt preservatives. (Exterior plywood shall be in accordance with APA E30.)
- D. All insulation boards shall be butted together with no gaps greater than 1/4 inch. Gaps greater than 1/4 inch shall be filled with the same material.

3.2.2 Protective Board

Install 1/2" protective board over the insulation board per manufacturer's instructions, where located on drawings.

3.2.3 Membrane Placement and Attachment (Membrane Bonding)

- A. Ensure that water does not flow beneath any completed sections of the membrane system. This will include completion of all flashings, terminations and daily seals. Begin the installation at the highest point of the project area and work to the lowest point to prevent water infiltration.
- B. Execute work so the completed splices and daily seals will not buck water. Daily seals are completed with Nite-Seal and Lay Flat Tubing.
 - 1) Position .060 inch thick non-reinforced EPDM membrane over the acceptable substrate without stretching. White side up.
 - 2) Allow membrane to relax approximately 1/2 hour prior to bonding.
 - 3) Fold sheet back 5 feet so that half of the underside of the sheet is exposed. Sheet fold shall be smooth without wrinkles or buckles.
 - 4) Stir bonding adhesive and apply evenly, without globs or puddles. Roll the adhesive with a 9 inch wide plastic core short nap paint roller to both the sheet and the substrate to achieve 100% coating of both surfaces at a coverage rate of approximately 60 square feet per gallon on completed adhered sections.
 - a. A mechanical roller dispenser or a mechanical sprayer can be used to apply bonding adhesive when the 100% coating and coverage rate noted above are maintained. If only a mechanical sprayer is used to apply bonding adhesive, the adhesive must be rolled upon spraying with a 9 inch wide plastic core short nap paint roller.
 - b. Bonding surface shall be dry and clean.
 - c. Bonding adhesive and its fumes contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near fire. Care must also be exercised to ensure that open containers are not placed near fresh air intake ventilators on the roof. Consult container labels and material safety data sheets for specific information.
 - d. Do not apply bonding adhesive to the minimum 3 inch wide splice area.

- 5) Allow adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
- 6) Roll the coated membrane into the coated substrate while avoiding wrinkles.
- 7) Brush down the bonded half of the sheet, immediately after rolling the sheet into the adhesive, with a soft bristle push broom to achieve maximum contact.
- 8) Fold back the unbonded half of the sheet and repeat the bonding procedure.
- 9) Install adjoining sheets in the same manner, lapping edges a minimum of 3 inches.

C. Membrane Splicing

Membrane splices shall be a minimum of 3 inches wide. Field splices at roof drains shall be located outside the drain sump.

- 1) Bond adjoining sheets in place and remove dirt and excess dust from the mating surfaces of both sheets by wiping with a clean rag. If necessary, scrub the sheets with warm soapy water to remove dust, dirt or other contaminants and rinse with clean water.
- 2) Clean the dry splice area of both sheets by scrubbing with Sure-Seal HP Splice Wipes or clean natural fiber rags using Sure-Seal/Brite Ply Splice Cleaner. Extra cleaning is required along a factory seam which intersects a splice area. Sponges, sponge mops, squeegees, brushes, paint rollers, etc. must not be used.
 - a. Brite-Ply Splice Cleaner, used in the splicing procedure, and its fumes are extremely flammable. Do not use near fire, flame or in a confined or unventilated area. Dispense only from an OSHA approved safety can.
 - b. Hycron gloves (available from the membrane manufacturer) are required for hand protection when splice cleaner is being used.
- 3) Hold the top sheet back as the cleaning and scrubbing process proceeds along the length of the splice so that both mating surfaces may be cleaned simultaneously.

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- 4) Stir Brite-Ply Splicing Cement thoroughly until it has a solid black appearance with no heavier black material remaining on the bottom or sides of the can (minimum 5 minutes stirring is recommended).
 - a. Splicing surfaces shall be dry and clean.
 - b. Splicing cement and its fumes contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near fire. Care must also be exercised to ensure that open containers are not placed near fresh air intake ventilators on the roof. Consult container labels and material safety data sheets for specific information.
- 5) Apply Brite-Ply Splicing Cement to both mating surfaces with either a 3 or 4 inch wide 1/2 inch medium nap roller or 1/2 inch thick paint brush. Apply cement smoothly and evenly to obtain 100% coverage. Do not allow the cement to glob or puddle.
 - a. Approximately 150 linear feet of coverage per gallon can be achieved for a 3 inch wide membrane splice (when the coated surface is approximately 4 inches wide on both mating surfaces).

D. Additional Membrane Securement

- 1) Securement shall be provided at the perimeter of each roof level, roof section, curb flashing, expansion joint, etc., at any inside angle change where slope or combined slopes exceed 2 inches in one horizontal foot, and at other penetrations in accordance with manufacturer's details.

3.2.4 Flashings and Other Related Work

Flashing material shall be cut from EPDM membrane or uncured EPDM elastoform flashing. See Contract Drawings and manufacturer's detailed instructions for flashing details and for installation of accessories.

3.2.5 Roof Walkway Pads

Provide and install (per manufacturer's installation instructions) walkways where noted on the Contract Drawings. Fully adhere pads.

3.3 **FIELD QUALITY CONTROL**

- A. Upon completion of installation, the Roofing Contractor will provide a Job Completion Statement to the roofing manufacturer to initiate final inspection.
- B. Inspection during installation and at completion shall be made by a representative of the roofing manufacturer to ascertain that the roof system has been installed in accordance with the manufacturer's specifications and drawings. A final construction acceptance inspection report shall be submitted to the Buyer along with the roofing system warranty required by the Contract.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

On completion, the roofing contractor shall remove all excess material and debris from project site.

3.6 **PROTECTION**

Completed roofing shall be protected from damage until roof is accepted.

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07600
FLASHING AND SHEET METAL
B-595-C-E350-07600

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0884 AND CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

S. C. Sam 7/29/93
S. C. Sam, Assoc. Architect Date

CHECKER:

J. L. Datte 7-29-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLD)
J. L. Datte Architectural Lead

7-29-93
Date

SECTION 07600
FLASHING AND SHEET METAL
B-595-C-E350-07600

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SECTION 07600
FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing sheet metal flashing, including counterflashing and metal trim. It also includes miscellaneous sheet metal items.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A167	1990 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
ASTM A525	1991 Steel Sheets, Zinc-Coated (Galvanized) by the Hot-Dip Process
ASTM B32	1989 Solder Metal
ASTM B69	1966 (Rev. 1979) Rolled Zinc
ASTM B209	1990 Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	1984 Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube
ASTM B284	1979 (Rev. 1984) Rosin Flux-Core Solder

AMERICAN WELDING SOCIETY, INC. (AWS)

AWS D1.2	1983 Structural Welding Code Aluminum
SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC. (SMACNA)	
SMACNA ASMM	1987 Architectural Sheet Metal Manual

1.3 **RELATED REQUIREMENTS**

Specification Section 07465 Metal Wall System
Specification Section 07500 Membrane Roofing System
Specification Section 07900 Sealants
Specification Section 09900 Painting

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

Includes flashing to prevent penetration of moisture into or through the building envelope, and which is not covered under Section 07500 Membrane Roofing, or Section 07465 Metal Wall System. It also includes interior sheet metal work (Joints and Closures etc.) and exterior gutters and downspouts.

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Drawings**

- A. Flashing and counterflashing
- B. Flashing at roof penetrations and roof curbs
- C. Flashing at exterior doors and louvers
- D. Flashing at wall penetrations (that are not part of metal wall system work)
- E. Metal fascia
- F. Interior sheet metal items (Joints and Closures etc.)
- G. Gutters

Indicate thicknesses, dimensions, fastenings and anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items. Include manufacturer's installation instructions.

1.6.2 Samples

- A. Sheet metal materials
- B. Fastener Types

Submit each type of sheet metal material.

1.6.3 Certified Material Test Reports

- A. Sheet metal materials

Submit for each type of sheet metal material.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. The effects of snow drifts shall be considered. Minimum snow load: 20 psf
- B. Basic wind speed at standard height of 33 feet: 70 mph
- C. Rainfall Intensity: Maximum of 1" in 24 hour period
- D. Outside Design Temperature: Maximum 110°F, Minimum -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Furnish sheet metal items in 8 to 10 foot lengths. Single pieces less than 8 feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Provide accessories essential to complete the sheet metal installation. These accessories shall be made of the same materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gauge, thickness, or weight shown in Table I. Sheet metal items shall have mill finish unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used except as follows:

TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAUGES

SHEET METAL ITEMS	ALUMINUM, INCH	ZINC-COATED STEEL, U.S. STD. GAUGE
Covering on minor flat, pitched or curved surfaces	.040	-
Flashings	-	24
Fascias: Sheets, smooth	.050	24

2.1.1 Exposed Sheet Metal Items

Shall be of the same material. The following items shall be considered as exposed sheet metal: Fascias, counter flashing, exterior wall flashing, and all exposed to view sheet metal, interior and exterior.

2.1.2 Steel Sheet, Zinc-Coated (Galvanized)

ASTM A525.

2.1.2.1 Finish

Exposed exterior items of zinc-coated steel sheet shall have a baked-on, factory-applied color coating of polyvinylidene fluoride or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Finish coating dry-film thickness shall be 0.8 to 1.3 mils and color shall be per Contract Drawings.

2.1.3 Zinc Sheet and Strip

ASTM B69, Type I, a minimum of 0.024-inch thick.

2.1.4 Aluminum Alloy Sheet and Plate

ASTM B209, form alloy, and temper appropriate for use.

2.1.4.1 Finish

Exposed exterior sheet metal items of aluminum shall have a baked-on, factory-applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Finish coating dry-film thickness shall be 0.8 to 1.3 mils, and color shall be as noted on Contract Drawing.

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- 2.1.5 Aluminum Alloy, Extruded Bars, Rods, Shapes, and Tubes
ASTM B221.
- 2.1.6 Soldering Flux
ASTM B284.
- 2.1.7 Solder
ASTM B32. Solder shall have lead content less than 0.2 percent.
- 2.1.8 Stainless Steel
Conforming to ASTM A167. Material shall be 20 gauge unless otherwise noted.
 - A. Exterior: Type 302/304; No. 2D Mill Rolled Finish
 - B. Interior: Type 430; No. 3 Mill Polished Finish
- 2.1.9 Fasteners
Use the same metal or a metal compatible with the item fastened.
Use stainless steel fasteners at exterior and to fasten dissimilar materials.
- 2.1.10 Finish Color
Finish color coating shall match adjacent surface color unless noted otherwise in final color selection.
- 2.2 **FABRICATION AND MANUFACTURE**
Fabricate flashings to shapes and dimensions shown on the Contract Drawings.

PART 3 EXECUTION

3.1 PREPARATION

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA ASMM, Architectural Sheet Metal Manual. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Coordinate work with requirements of related sections.

3.1.1 Pre-Installation Conference

The Seller shall attend pre-installation conferences of related work.

3.2 **INSTALLATION, APPLICATION AND ERECTION**

3.2.1 Cleats

Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on centers unless otherwise specified or indicated. Unless otherwise specified, cleats shall be not less than 2 inches wide by 3 inches long and of the same material and thickness as the sheet metal being installed. Secure one end of the cleat with two nails and the cleat folded back over the nailheads. Lock the other end into the seam. Prein cleats for soldered seams.

3.2.2 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.

3.2.3 Seams

Straight and uniform in width and height with no solder showing on the face.

3.2.3.1 Flat-Lock Seams

Finish not less than 3/4-inch wide.

3.2.3.2 Lap Seams

Finish soldered seams not less than one-inch wide. Overlap seams not soldered, not less than 3 inches.

3.2.3.3 Loose-Lock Expansion Seams

Not less than 3 inches wide; provide minimum one-inch movement within the joint. Completely fill the joints with the specified sealant, applied at not less than 1/8-inch thick bed. Sealants are specified in Section 07900, "Sealants".

3.2.3.4 Standing Seams

Not less than one inch high, double locked without solder.

3.2.3.5 Flat Seams

Make seams in the direction of the flow.

3.2.4 Soldering

Where soldering is specified, it shall apply to zinc-coated steel or stainless steel.

3.2.5 Welding and Mechanical Fastening

Use welding for aluminum of thickness greater than 0.040 inch. Aluminum 0.040 inch or less in thickness shall be butted and the space backed with formed flashing plate; or lock joined, mechanically fastened, and filled with sealant as recommended by the aluminum manufacturer.

3.2.5.1 Welding of Aluminum

Use welding of the inert gas, shield-arc type. For procedures, appearance and quality of welds, and the methods used in correcting welding work, conform to AWS D1.2.

3.2.5.2 Mechanical Fastening of Aluminum

Use No. 12, stainless steel fasteners. Drive fasteners in holes made with a No. 26 drill in securing side laps, end laps, and flashings. Space fasteners 12 inches maximum on centers. Where end lap fasteners are required to improve closure, locate the end lap fasteners not more than 2 inches from the end of the overlapping sheet.

3.2.6 Protection from Contact with Dissimilar Materials

3.2.6.1 Aluminum

Aluminum surfaces shall not directly contact other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a Zinc Chromate primer followed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

3.2.6.2 Metal Surfaces

Paint surfaces in contact with concrete materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.2.6.3 Other Absorptive Materials

Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

3.2.7 Expansion and Contraction

Provide expansion and contraction joints at not more 32-foot intervals for aluminum and at not more than 40-foot intervals for other metals. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, an additional joint shall be provided. Space joints evenly. Join extruded aluminum gravel stops and fascias by expansion and contraction joints spaced not more than 12 feet apart.

3.2.8 Gravel Stops and Roof Edge Fascias

Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Extend flange at least 4 inches onto roofing. Provide prefabricated, mitered internal and external corners.

3.2.9 Edge Strip

Hook the lower edge of fascias at least 3/4 inch over a continuous strip of the same material bent outward at an angle not more than 45 degrees to form a drip. Fasten hook strip to metal cleats at 12 inches maximum on centers. Where necessary, install strips over 1/16-inch thick compatible spacer or washers.

3.2.10 Joints

Leave open the section ends of fascias 1/4 inch and back with a formed flashing plate, mechanically fastened in place and lapping each section end a minimum of 4 inches. Set laps in plastic cement. Face nailing will not be permitted. Install prefabricated metal fascias in accordance with the manufacturer's printed instructions and details.

3.2.11 Painting

Field-paint sheet metal for separation of dissimilar materials. Finish painting is specified in Specification Section 09900, "Painting".

3.2.12 Gutters

Provide gutters in sizes indicated complete with mitered corners, end caps, outlets, brackets and other accessories necessary for installation. Provide expansion-type slip joints midway between outlets. Fabricate hangers and fastenings from same material as gutters.

3.2.13 Downspouts

Provide downspouts in sizes indicated complete including elbows and offsets. Provide downspouts in approximately 10-foot lengths with end joints to telescope not less than 1/2 inch. Keep downspouts not less than one inch away from walls and fasten to the walls approximately at five feet on centers with straps one inch wide. Form straps from same material as downspouts.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

Repairs to Finish

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of color and surface texture. Replace items which cannot be repaired.

3.5 CLEANING

Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

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3.8

SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07730
ROOF HATCHES
B-595-C-E350-07730

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 07730
ROOF HATCHES
B-595-C-E350-07730

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SECTION 07730
ROOF HATCHES

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing roof hatches.

1.2 REFERENCES

(Not Used)

1.3 RELATED REQUIREMENTS

Specification Section 01730 Operation and Maintenance Data

Specification Section 07500 Membrane Roofing System

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Manufacturer's Data

- A. Complete illustrations and description of the product.
- B. Installation instructions.
- C. Maintenance instructions, in accordance with Specification Section 01730, "Operation and Maintenance Data", with a list of local service companies.
- D. Manufacturer's standard warranty.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Minimum snow load: 20 psf
- B. Basic wind speed at standard height of 33': 70 mph
- C. Rainfall Intensity: Maximum of 1" in 24 hour period

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- 2.1.1 Factory fabricated roof hatch for ladder access. Size noted on drawings. Curb, curb frame and lid shall be minimum 14 gauge galvanized steel, fully welded and ground smooth. Heavy duty galvanized pivot hinges. Lid insulated with fiberglass insulation, (R-19 min) protected by a 20 gauge lid liner. Inside and outside handles. Provision for padlocking. Heavy duty lid operator unit. Automatic hold-open. Neoprene seals. Insulated curb frame. Dur-Red Model LH or equal.

2.1.2 Fasteners

Mechanical fasteners shall be used to secure the roof hatch to the roof decking and provide resistance to wind suction pressure of 46.0 psf.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

- A. Inspect roof opening to receive hatch.
- B. In the event of discrepancy, immediately notify the Buyer.
- C. Do not proceed until authorized by the Buyer.

3.2 INSTALLATION, APPLICATION AND ERECTION

- A. Install roof hatches in accordance with manufacturer's written instructions and approved drawings.
- B. Coordinate with work of roofing and flashing installation.

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3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

On completion, remove all excess material and debris from the project site.

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 07900
SEALANTS
B-595-C-E350-07900

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte (FOR JLO) 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLO)
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 07900
SEALANTS
B-595-C-E350-07900

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SECTION 07900 SEALANTS

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing sealants not specified elsewhere.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C920 1987 Elastomeric Joint Sealants

1.3 RELATED REQUIREMENTS

Specification Section 09250 Gypsum Board

Specification Section 07600 Flashing and Sheet Metal

Specification Section 08110 Steel Doors and Frames

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements Section of the Order/Subcontract:

1.6.1 Manufacturer's Catalog Data

A. Sealants

B. Primers

C. Backer Rods

Data for the sealants shall include shelf life, recommended cleaning solvents, and manufacturer recommended installation procedure.

1.6.2 Manufacturer's Standard Color Charts

Submit not less than 9 different colors to match adjacent wall or roof colors noted on contract drawings (3 samples for each three colors noted on contract drawings).

1.6.3 Manufacturer's Instructions

Submit detailed application instructions, precautions and mixing instructions for multicomponent sealants.

1.6.4 Samples

1.6.5 Sample Installations

Before sealant work is started, submit a sample of each type of finished joint where directed. Sample shall show the workmanship, bond, and color of sealant. The workmanship, bond, and color of sealant throughout the project shall match the approved sample joints.

1.6.6 Test Reports

Indicate sealant compatibility with commonly used substrates.

1.6.7 Certified Material Test Reports

- A. Sealants
- B. Primers
- C. Bond Breakers
- D. Backer Rods

Submit certificates from the manufacturers attesting that materials meet the specified requirements.

1.6.8 Material Safety Data Sheets (MSDS)

Submit applicable MSDS for each sealant type. Submit with material delivery to site, and with additional copies to the Buyer.

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1.6.9 Packaging and Marking

Packaging materials that are certified by the manufacturer to be in compliance with this specification shall be labeled as to type, class, grade and use.

1.6.10 Storage

Store material on site in dry enclosure within temperature range as specified by sealant manufacturer.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

The ambient temperature shall be within the limits of 40 and 100°F when sealant is applied.

1.8.1 Outside Design Temperature

- A. Maximum Design Temperature, 110°F
- B. Minimum Design Temperature, -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Provide sealant that has been tested and found suitable for the substrates to which it will be applied.

2.1.1 Interior Sealant

ASTM C920, Type S, Grade NS, Class 12.5, Use NT. Location(s) and color(s) of sealant shall be as follows:

	LOCATION	COLOR
A.	Small voids between walls and adjacent door frames, surface-mounted equipment and fixtures, and similar items	Match adjacent wall color
B.	Perimeter of frames at doors, louvers, which adjoin exposed interior metal wall liner surfaces	Match adjacent wall color

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- | | | |
|----|---|------------------------------|
| C. | Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted | Match adjacent surface color |
|----|---|------------------------------|

2.1.2 Exterior Sealant

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use NT. Location(s) and color(s) of sealant shall be as follows:

	LOCATION	COLOR
A.	Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations	Match adjacent surface color
B.	Expansion and control joints	Match adjacent surface color
C.	Voids where items pass through exterior walls	Match adjacent surface color
D.	Metal-to-metal joints where sealant is indicated or specified	Match adjacent surface color

2.1.3 Floor Joint Sealant

ASTM C920, Type S or M, Grade P, Class 25, Use T. Location(s) and color(s) of sealant shall be as follows:

	LOCATION	COLOR
A.	Control and expansion joints in slabs	Match adjacent floor color

2.1.4 Primer for Sealant

Provide a nonstaining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

2.1.5 Bond Breakers

Provide the type and consistency recommended by the sealant manufacturer for the particular application.

2.1.6 Backer Rods

Compressible rod stock of polyethylene foam, butyl rubber foam, neoprene foam, or other flexible, permanent, durable, nonabsorbent material, 33 percent to 50 percent larger than joint as recommended for compatibility with sealant by sealant manufacturer.

2.1.7 Cleaning Solvents

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Surfaces shall be clean, dry to the touch, and free from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. When resealing an existing joint, remove existing calk or sealant prior to applying new sealant.

A. Steel Surfaces

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finish work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue-free solvent.

B. Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive just prior to sealant application. For removing protective coatings and final cleaning, use nonstaining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

3.1.2 Preparation - Sealant

Do not add liquids, solvents, or powders to the sealant. Mix multicomponent elastomeric sealants in accordance with manufacturer's instructions.

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3.2 **INSTALLATION, APPLICATION AND ERECTION**

3.2.1 Install per manufacturer's instructions.

3.3 **FIELD QUALITY CONTROL**

Refer to the "use before" date on the packaging carton. Sealants whose shelf life has been exceeded are not acceptable for use.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

After material is applied and tooled, the Seller shall remove all masking and other protection, and clean up any defacement caused by his work. The Seller shall remove all excess material and debris from the site.

3.6 **PROTECTION**

3.6.1 All work adjacent to sealant shall be protected where required, unless otherwise approved by the Buyer. Unless otherwise approved, surfaces adjacent to joints requiring sealant will be masked with pressure sensitive masking tape.

3.6.2 Drop cloths shall be provided over all horizontal surfaces liable to receive droppings of sealant operations.

3.6.3 Misapplied sealants and droppings shall be immediately removed by methods and materials recommended in writing by manufacturer.

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 08110
METAL DOORS AND FRAMES
B-595-C-E350-08110

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

G. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 08110
METAL DOORS AND FRAMES
B-595-C-E350-08110

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SECTION 08110
METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing interior and exterior metal doors and frames.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C591	1985 Unfaced Preformed Rigid Cellular Polyurethane Thermal Insulation
ASTM E283	1984 Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors
ASTM E330	1970 Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads
ASTM E331	1986 Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM A525	1991 (Rev. A) Standard Specifications for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process

DOOR AND HARDWARE INSTITUTE (DHI)

DHI A115.1	1982 Preparation for Mortise Locks for 1-3/8 Inch and 1-3/4 Inch Doors
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STEEL DOOR INSTITUTE (SDI)

SDI 100	1985 Recommended Specifications - Standard Steel Doors and Frames
SDI 105	1982 Recommended Erection Instructions for Steel Frames

SDI 107 1984 Hardware on Steel Doors
 (Reinforcement - Application)

1.3 **RELATED REQUIREMENTS**

Specification Section 08700 Finish Hardware

Specification Section 07900 Sealants

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Manufacturer's Catalog Data**

- A. Doors
- B. Door Frames
- C. Accessories
- D. Fasteners

Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. Include manufacturer's printed installation instructions.

1.6.2 **Shop Drawings**

- A. Metal doors
- B. Door Frames

Show elevations, construction details, metal gauges, hardware provisions, method of glazing, fastenings, proposed method of anchoring, size and spacing of anchors and installation details.

1.6.3 Shop Drawing Schedule

- A. Doors and frames
- B. Identify door and frame locations. Use door numbers from Contract Drawings.

1.6.3.1 Test Reports of Air and Water Infiltration Tests

ASTM E283 and ASTM E331; air infiltration shall not exceed 1.25 cubic foot per minute per foot of crack length when subjected to a static pressure of 1.56 pounds per square foot (equivalent to a wind velocity of 25 miles per hour). The amount of water penetration shall be "zero" when tested in accordance with ASTM E331.

1.6.3.2 ASTM E330; members shall withstand a uniform wind load of 20 pounds per square foot of window area without deflecting more than 1/175 of the span.

1.6.4 Certified Material Test Reports

- A. Doors
- B. Frames
- C. Accessories
- D. Fasteners

Submit certificates attesting that doors, frames, and accessories meet the requirements specified herein. Include the grade and model of each door.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Seismic Zone is 2B.
- B. Outside Design Temperature
 - 1) Maximum Design Temperature, 110°F
 - 2) Minimum Design Temperature, -20°F
- C. Wind Load at standard height of 33 feet shall be 70 MPH, based on terrain exposure "C".

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

SDI 100, except as specified otherwise. Doors shall be either hollow steel construction or composite construction. Prepare doors to receive hardware specified in Specification Section 08700, "Finish Hardware". Exterior doors shall have top edge closed flush. Doors shall be 1-3/4 inches thick, unless otherwise indicated.

2.1.1 Extra Heavy Duty Doors

SDI 100, Grade III, Model 4 for exterior doors of size(s) and design(s) indicated. Provide where shown in door schedule and contract drawings. Fill hollow steel exterior doors with insulation. Minimum R-value shall be 3.12.

2.1.2 Heavy Duty Steel Door

SDI 100, Grade II, Model 4, for interior doors except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners.

2.1.3 Welded Steel Frames

Continuously weld frame faces at corner joints. Continuously weld stops and rabbets. Grind welds smooth. Provide 14 gauge exterior frames, and 16 gauge interior frames, unless otherwise indicated. Construct to SDI-100 Standards.

2.1.4 Stops and Beads

Form stops and beads from 20-gauge steel. Secure beads to frames with oval-head, countersunk Phillips-head self-tapping sheet metal screws or concealed clips and fasteners. Space fasteners approximately 12 to 16 inches on centers. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

2.1.5 Anchors

Provide anchors (minimum 18 gauge) to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint. Provide a minimum of three anchors for each jamb. Locate anchors opposite top and bottom hinges and midway between. Provide floor anchors drilled for 3/8-inch anchor bolts at bottom of each jamb member.

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2.1.6 Door Hardware Preparation

Reinforce, drill, and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI 107 and DHI A115.1. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI 100, as applicable. Punch door frames with the exception of frames that will have weatherstripping gasketing, to receive a minimum of three door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

2.1.7 Finishes

- A. Unless specified otherwise, phosphate treat and factory prime metal doors and frames as specified in SDI 100.
- B. Fabricate exterior doors from electrolytic zinc-coated steel, ASTM A525, Commercial Quality, Coating Class A. Phosphate treat and factory prime zinc-coated surfaces as specified in SDI 100. Provide for all exterior doors.

2.1.8 Core Filler Material

Foamed in place polyurethane or polystyrene material.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. Design frames in exposed exterior walls to allow sufficient space between the inside back of trim and exterior wall to receive caulking compound.

2.2.2 Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging. Strap welded frames in pairs, with one frame inverted, or provide temporary steel spreaders securely fastened to the bottom of each door frame. Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 1/4 inch airspace between doors. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new. Provide identification, label doors and frames to match door numbers from Contract Drawings.

PART 3 EXECUTION

3.1 PREPARATION

(Not Used)

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Door Frames

Set frames in accordance with SDI 105. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of door frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Where frames require ceiling struts or overhead bracing, anchor frames to the struts or bracing.

3.2.2 Doors

Hang doors in accordance with clearances specified in SDI 100. After erection, clean and adjust hardware.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

Make all necessary adjustments to ensure smooth operation of doors and hardware.

3.5 CLEANING

Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

3.6 PROTECTION

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted areas until all rust is removed, clean thoroughly, and apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.7 DEMONSTRATION

(Not Used)

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

Rev. 1

3.8 SCHEDULES

Refer to Contract Drawings for door schedule.

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 08305
ACCESS DOORS
B-595-C-E350-08305

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam
S. C. Sam, Assoc, Architect

7/20/93
Date

J. L. Datte
J. L. Datte, Architectural Lead

7-20-93
Date

APPROVED BY:

J. L. Datte
J. L. Datte

Architectural Lead

7-20-93
Date

SECTION 08305
ACCESS DOORS
B-595-C-E350-08305

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**SECTION 08305
ACCESS DOORS**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing access doors.

1.2 REFERENCES

(Not Used)

1.3 RELATED REQUIREMENTS

Specification Section 01730 Operation and Maintenance Data

Specification Section 09250 Gypsum Board

Specification Section 09900 Painting

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements Section of the Order/Subcontract:

1.6.1 Manufacturer's Data

- A. Complete illustrations and description of the product.
- B. Installation instructions.
- C. Maintenance instructions in accordance with Specification Section 01730, "Operation and Maintenance Data".
- D. Manufacturer's standard warranty.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.8.1 Interior Operating Environment

Temperature Range 72°F to 78°F.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Factory fabricated access doors for installation in walls or suspended ceilings. The products listed herein are manufactured by Milcor, Lima, Ohio, and are identified in order to establish a level of quality. Other manufacturer's products are acceptable provided they meet the requirements of this specification and as approved by Buyer.

2.1.1 Access Door for Suspended Drywall Ceilings

- A. Style ATR with panel face of wallboard and finished to match adjacent surfaces.
- B. Provide 16 gauge steel frame with 18 gauge steel door panel.
- C. Steel shall have baked-on electrostatic powder prime coat. Exposed edges: Prime coat of white, rust inhibitive paint.
- D. Continuous type hinge of steel with stainless steel pin.
- E. Flush lock, screwdriver-operated with steel cam. Plastic grommet at hole to cam lock.
- F. Provide 24 inch x 24 inch size door unless shown otherwise on drawings.

2.1.2 Access Door for Wall (Drywall Surface)

- A. Style M flush panel.
- B. Provide 16 gauge steel frame with 14 gauge steel panel with 16 gauge steel 1" wide flange.
- C. Factory-applied baked-on enamel prime coat, chemically bonded to steel.
- D. Concealed spring-type hinges, opening to 165°.
- E. Flush lock, screwdriver-operated with steel cam.

F. Provide 12 inch x 12 inch door unless noted otherwise on drawings.

2.1.3 Access Door for Wall (Ceramic Tile Surface)

A. Style MS flush panel.

B. Same as style M in Paragraph 2.1.2, except stainless steel with satin finish.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

Inspect existing conditions prior to commencement of work. Bring unsatisfactory conditions to the attention of the Buyer.

3.2 INSTALLATION, APPLICATION AND ERECTION

Install each access door securely, anchor and place in plumb and level condition without distortion as shown on drawings and in accordance with manufacturer's printed instructions.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

(Not Used)

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

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3.8 SCHEDULES
(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 08365
TELESCOPING DOORS
B-595-C-E350-08365

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ___ NO X
QUALITY LEVEL I ___ II X
SAFETY CLASS 1 ___ 2 ___ 3 X 4 ___

ORIGINATOR:

CHECKER:

S. C. Sam
S. C. Sam, Assoc. Architect

7/20/93
Date

J. L. Datte
J. L. Datte, Architectural Lead

7-20-93
Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 08365
TELESCOPING DOORS
B-595-C-E350-08365

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SECTION 08365 TELESCOPING DOORS

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing motor operated telescoping service doors.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C236	1989 Test Method for Steady-State Thermal Performance of Building Assemblies
ASTM E283	1991 Test Method for Determining the Rate of Air Leakage through Exterior Doors
ASTM E90	1990 Test Method for Measurement of Airborne Sound Transmission Loss of Building Partitions

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	1988 General Standards for Industrial Controls and Systems
NEMA ICS 2	1988 Industrial Control Devices, Controllers and Assemblies
NEMA ICS 6	1988 Enclosures for Industrial Controls and Systems
NEMA MG 1	1987 Motors and Generators
NEMA ST 1	1988 Specialty Transformers

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	1990 National Electrical Code (NEC)
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FEDERAL SPECIFICATIONS (FS)

FS-RR-W-410 D	1988 Wire, Rope and Strand
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1.3 RELATED REQUIREMENTS

Specification Section 01730 Operation and Maintenance Data

Specification Section 16100 Electrical Installation

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Shop Drawings

Submit drawings for doors showing types, sizes, locations, metal gages, hardware provisions, installation details, and other details of construction. Include wiring diagrams for motors and controls, supporting brackets for motors, location, type, and ratings of motors, and safety devices.

1.6.2 Installation Procedures

Submit manufacturer's currently recommended installation procedures for doors along with the shop drawings.

1.6.3 Materials List

Provide materials list of items proposed to be furnished under this specification.

1.6.4 Manufacturer's Certification

Submit certification that the doors and accessories conform to all requirements of this specification and of the referenced documents.

1.6.5 Operation and Maintenance Manual

Submit operation and maintenance manual for the approved, installed door assembly in accordance with Specification Section 01730, "Operation and Maintenance Data", including a list of local service companies.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Wind load at standard height of 33 foot shall be 70 mph, based on terrain exposure "C".
- B. Seismic Zone is 2B.
- C. Outside Design Temperature
 - 1) Maximum Design Temperature 110°F
 - 2) Minimum Design Temperature -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Doors shall be telescoping steel doors. They shall be motor operated, vertically opening, overhead telescoping type, and shall be designed for use on exterior openings, as shown on the Contract Drawing. Doors shall be operated by electric-power with auxiliary hand chain operation. Doors shall be complete with guides, hardware, fastenings, operating mechanisms and accessories. Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to provide a clear opening when door is in open position. Doors, hardware and anchors shall be designed to withstand a wind pressure of 20 pounds per square foot of door area without damage.

2.1.1 Warning Indicator Devices

A rotating beacon light fixture and alarm bell shall be provided on the building exterior. Both shall be activated when the door is in any open position.

2.1.1.1 Rotating Beacon Light Fixture

Rotating sealed beacon; 200 watt incandescent lamp at 120 volts; amber lens, weather proof.

2.1.1.2 Alarm Bell

Provide an alarm bell rated at 90 decibels NEMA 3R enclosure or weather proof enclosure.

2.1.2 Manufacturer

The telescoping door manufactured by Milcor Incorporated of Lima, Ohio, is the basis of this specification in order to establish a level of quality. Other manufacturer's products are acceptable provided they meet the requirements of this specification and as approved by Buyer.

2.2 FABRICATION AND MANUFACTURE

Door assemblies shall be in sizes as indicated on the drawings, complete with three major sub-assemblies: side guides, header box and curtain.

2.2.1 Side Guides

Formed, 10 gage galvanized steel, shaped outer guides and detachable inner guides of manufacturer's standard design shall be provided with minimum 3/8-inch x 3-inch x width of guide mounting and stiffener angle for anchoring to jamb framing. Both edges of guide shall have a continuous plastic edge strip.

2.2.2 Header Box

2.2.2.1 Manufacturer's standard design, 10 gage galvanized steel construction, shall completely enclose factory installed motor, reducer, coupling, drive shaft, winding drums, steel lifting cables, switches, sprockets, bearings and all electrical wiring therein.

2.2.2.2 The top of header box shall be equipped with lateral brace connection angle per manufacturer detail, minimum angle 4x4x3/8, at five (5) places for lateral wind pressure acting on the door.

2.2.3 Curtain

Formed of minimum 22 gage hot-dip galvanized steel into inverted "U" shaped hollow sections. The curtain shall be operated by steel cables fabricated in accordance with Federal Specification RR-W-410 Type I, Class 3, and shall be 1/4-inch diameter #6x37 IPS fiber core. The two cables shall be attached to the bottom section of the curtain and extend up through the remaining sections to winding drums in the header box. As the door closes, the nested sections shall descend as a unit at a speed of approximately 40 feet per minute. Individual sections shall peel off one at a time as hooks in their top edges are engaged by the continuous bottom flanges of the sections above. When the door is fully closed, there shall be no strain on the cables. The bottom sections shall rest on the floor and each other section shall be supported by the one immediately above.

2.2.4 Sill

Extruded aluminum with vinyl weatherseal shall house a minimum of three limit switches per bottom panel. Sill shall be designed to adjust to a maximum 2-inch floor differential.

2.2.5 Locking Devices

Dual locking security bolts shall be provided to automatically engage in both side guides when door stops in the fully closed position, and unlocks automatically before door begins to travel upward. Should a cable fail, these locking security bolts shall engage in the next lower slot (approximately six total) in the side guides, stopping the downward descent of the curtain.

2.2.6 Thermal Transmittance

ASTM C-236 shall yield an 0.51 "U" value for the complete door tested.

2.2.7 Air Infiltration

ASTM E-283 shall show draft exclusion-leakage of 0.93 cfm per linear foot of perimeter at 1.56 psf air pressure (25 mph wind).

2.2.8 Sound Transmission

ASTM E-90 shall show a class rating of 29.

2.2.9 Weatherseals

- A. Door curtain weatherseals shall be continuous strips of fabric backed nylon pile, factory applied on the door curtain panels. Attach to both bottom flanges of each panel before the panel nest is assembled.
- B. Side guide weatherseals shall be continuous strips of closed cell sponge neoprene, factory assembled to the plastic wear strip for field application on the exterior side of the guides.

2.2.10 Stability

Door curtain and frame (Jamb and header box sections) shall be designed to resist lateral wind pressure of 25 PSF. The header box and jambs shall be braced and anchored to structural members to provide WIND stability of the telescoping door.

2.3 ELECTRIC OPERATION

2.3.1 Operator Features

Provide operators complete with electric motor, direct drive, helical type reducer fully enclosed and operating in an oil bath, steel chain and sprockets, magnetic brake, overload protection, brackets, push button controls, geared limit switches, magnetic reversing starter, and other accessories necessary for proper operation. Make provision for immediate emergency manual operation of door by chain-gear mechanism in case of electrical failure. The emergency manual operating mechanism shall be so arranged that it may be put into and out of operation from the floor, and its use shall not affect the timing of the limit switches. Provide an electrical or mechanical device which will disconnect the motor from the operating mechanism when the emergency manual operating mechanism is engaged.

2.3.2 Motors

Motors shall conform to NEMA MG 1, high-starting torque, reversible type of sufficient horsepower and torque output to move the door in either direction from any position, and produce a door travel speed of not less than two-thirds foot or more than one foot per second, without exceeding the rated capacity. Motors shall be suitable for operation on 3-phase, 460 volt, 60 Hz power and shall operate at not more than 3600 rpm. Motor enclosures shall be the drip-proof type or NEMA TEFC type.

2.3.3 Controls

Each door motor shall have an enclosed, A.C. magnetic reversing starter, thermal-overload protection, solenoid-operated brake, limit switches, and remote control switches at locations indicated. Remote control switches shall be at least 5 feet above the floor line, and all switches shall be located so that the operator will have complete visibility of the door at all times. The control equipment shall conform to NEMA ICS 1 and NEMA ICS 2. Control enclosures shall be NEMA ICS 6, Type 12 and Type 4, except that starter enclosures may be NEMA 4. Locate control switches inside and outside the building as indicated. Controls shall be mounted within a keyed access panel. Each switch control station shall be of the three-button type, with the buttons marked "OPEN," "CLOSE" and "STOP". The buttons shall be of the type requiring only momentary pressure to operate. When the door is in motion, and the "STOP" button is pressed, the door shall stop instantly and remain in the stop position; from the stop position, the door may then be operated in either direction by the "OPEN" or "CLOSE" buttons. Push buttons shall be full-guarded to prevent accidental operation. Provide limit switches to automatically stop the doors

at their fully open and closed positions. Positions of the limit switches shall be readily adjustable.

2.3.4 Safety Features

- A. The bottom sill of power-operated doors shall have a pressure sensitive safety device that will immediately stop and reverse the door in its closing travel upon contact with an obstruction in the door opening and cause the door to return to its full open position. Do not use safety device as a limit switch. The low voltage electrical conductor for this device shall be concealed in hollow curtain, and shall be positively tensioned at all times on drive mechanism.
- B. Additional safety limits shall be provided in the header box assembly to back-up the primary limit control against over travel.
- C. Door operators shall be provided with an emergency hand chain engaged from the floor with a disconnect. The electrical disconnect shall prevent motor operation while hand chain is engaged.
- D. Chain drive door operators for doors with areas measuring 132 square feet or more, shall be provided with a chain-break safety stop designed to arrest downward rotation of the door shaft in the event of drive chain displacement.

2.3.5 Control Transformer

Control transformer shall be provided as necessary to reduce the voltage on the control circuits to 120 volts. The transformer shall conform to NEMA ST 1.

2.3.6 Electrical Work

Electrical components and factory assembly shall conform to NFPA 70. The door manufacturer shall furnish manual or automatic control and safety devices as required for proper operation of the doors. Conduit, wiring and mounting of controls is specified in Specification Section 16100.

2.4 FINISH

- A. Side guides, header box and embossed panel surface of curtain shall have galvanized and shop-prime coat. Shop finish with color as shown on the Contract Drawings.
- B. Curtain panels shall be G-90 galvanized steel with baked-on epoxy prime coat and with baked-on fluoropolymer finish coat in color on side exposed after fabrication. The panel

surface shall be embossed with a rigidizing pattern standard with the manufacturer.

2.5 MATERIAL DELIVERY, STORAGE AND HANDLING

- A. Deliver telescoping doors, equipment and associated hardware in the manufacturers original protective packing and crating. Clearly label each package with indelible material. Include a copy of materials list and installation instructions.
- B. Inspect doors and accessories for damage prior to acceptance and to be sure that the items included in the packing list have been supplied, and to assure that applicable documentation has been received and approved as required. Promptly report any damage or any missing components to the delivering carriers, the manufacturers, and the Buyer.
- C. Store doors in dry areas, protected from moisture to prevent rust and corrosion.

PART 3 EXECUTION

3.1 PREPARATION

- A. Check steel framed opening for dimension, levels and rigidity.
- B. Assure that openings are free from irregularities which would interfere with installation.
- C. Do not install doors until defects have been corrected.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Install doors in accordance with approved shop drawings and manufacturer's directions. Locate anchors and inserts for guides, header box, switches, hardware and other accessories accurately. Upon completion, doors shall be weathertight and shall be free from warp, twist or distortion.

3.2.2 The top at Header box shall be braced minimum (5) five places. Provide an angle brace connected to structural beams (W16) above the header box. Weld brace angle with minimum of 1/4 inch fillet weld all around. Vertical Jamb members shall be welded to the Structural Post member (TS 10x6) and embedded angle (L6x6) with minimum 1/4 inch fillet welds 2 inches long at 12 inches on center.

3.3 **FIELD QUALITY CONTROL**

(Not Used)

3.4 **ADJUSTMENTS**

- A. Assure that all frames are securely anchored, squared and aligned.
- B. Lubricate and adjust all doors and hardware to operate freely.
- C. Touch up any finish surface damage with compatible materials to match existing.

3.5 **CLEANING**

Verify that exposed surfaces are clean and free of excess sealants.

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

Following the completion of installation of the telescoping door and all appurtenances, demonstrate to the Buyer the operation of the door and all controls and ancillary devices. Ensure that all components function properly and as specified. Components which do not function properly following adjustment (including the door) shall be removed and replaced with new components at no additional cost to the Buyer.

Demonstration will also include a test of the operation against the specified wind pressure and for resistance to weather.

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 08700
FINISH HARDWARE
B-595-C-E350-08700

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0884 & CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/29/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-29-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLD)
J. L. Datte Architectural Lead

7-29-93
Date

SECTION 08700
FINISH HARDWARE
B-595-C-E350-08700

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**SECTION 08700
FINISH HARDWARE**

PART 1 GENERAL

1.1 SUMMARY

This section covers technical requirements for furnishing and installing all items of finish hardware necessary for completion of the project and not specified in other sections.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

**AMERICAN NATIONAL STANDARDS INSTITUTE, INC. / BUILDERS HARDWARE
MANUFACTURERS ASSOCIATION, INC. (ANSI/BHMA)**

ANSI/BHMA A156.1	1988 American National Standard for Butts and Hinges
ANSI/BHMA A156.2	1989 American National Standard for Bored and Preassembled Locks and Latches
ANSI/BHMA A156.3	1989 American National Standard for Exit Devices
ANSI/BHMA A156.4	1986 American National Standard for Door Controls - Closers
ANSI/BHMA A156.5	1984 American National Standard for Auxiliary Locks and Associated Products
ANSI/BHMA A156.6	1986 American National Standard for Architectural Door Trim
ANSI/BHMA A156.7	1988 American National Standard for Template Hinge Dimensions
ANSI/BHMA A156.8	1988 American National Standard for Door Controls - Overhead Holders
ANSI/BHMA A156.13	1987 American National Standard for Mortise Locks and Latches
ANSI/BHMA A156.16	1989 American National Standard for Auxiliary Hardware

Rev. 1

ANSI/BHMA A156.18 1987 American National Standard for
Materials and Finishes

ANSI/BHMA A156.21 1989 American National Standard for
Thresholds

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101 1988 Code for Safety to Life from Fire in
Buildings and Structures

STEEL DOOR INSTITUTE (SDI)

SDI-100 1985 Standard Steel Doors and Frames

1.3 **RELATED REQUIREMENTS**

Specification Section 01730 Operation and Maintenance Data

Specification Section 07900 Sealants

Specification Section 08110 Metal Doors and Frames

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

Provide as far as practicable locks, hinges, closers, and weather seals of one lock, hinge, closer, and weather seal manufacturer, respectively. Hardware shall not be modified to provide features indicated or specified without the prior written authorization by the manufacturer and approval of the Buyer.

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Manufacturer's Catalog Data**

Submit for each different hardware item to the Buyer.

1.6.2 **Manufacturer's Instructions**

Submit for each different hardware item instructions for its installation and adjustment.

1.6.3 Samples

Upon delivery to the site, select and tag one item of each different type. Identify each item by reference publication type number and manufacturer's catalog number. Items shall remain on file until similar items have been installed, at which time items on file shall be installed at predetermined locations.

1.6.4 Schedules

Submit Hardware Schedule including the following:

Hardware Set No.
Hardware Item
Quantity
Size
Reference Publication Type No.
Mfr. Name and Catalog No.
Key Control Symbols
UL Mark (if fire rated and listed)
BHMA Finish Designation

1.6.5 Test Reports

Indicate that each hardware item listed under the paragraph entitled "Hardware Items" in Part 2 meets the standard listed for that item. A copy of the listing of proposed hardware items in the current applicable ANSI/BHMA directories of certified products may be submitted in lieu of test reports.

1.6.6 Operation and Maintenance Manuals

Submit Hardware Schedule Items Data Package in accordance with Specification Section 01730, "Operation and Maintenance Data".

1.6.7 Administrative or Closeout Submittals

Submit key bitting charts to the Buyer prior to completion of the contract.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.8.1 Outside Temperatures

A.	Maximum	110°F
B.	Minimum	-20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Template Hardware

Hardware to be applied to metal or to prefinished doors shall be made to template. Promptly furnish template information or templates to door and frame manufacturers. Template hinges shall conform to ANSI/BHMA A156.7. Coordinate hardware items to prevent interference with other hardware.

2.1.2 Hardware for Exit Doors

NFPA 101 as well as to other requirements specified.

2.1.3 Hardware Items

Conform to the respective standards listed and to requirements specified herein. Hinges, locks, latches, bolts, and closers shall be clearly and permanently marked with the manufacturer's name or trademark where it will be visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover. Provide hardware items as specified below and as listed under the paragraph entitled "Hardware Sets".

2.1.3.1 Hinges

ANSI/BHMA A156.1, Grade 1, 4 1/2 by 4 1/2 inches, full mortise, heavy weight, antifriction bearing, button tip.

2.1.3.2 Locksets and Latchsets

Locksets and latchsets shall have standardized fronts, cases, and strikes so that varying functions will be interchangeable and will require only one mortise for their installation. Locks and latches shall have beveled bronze fronts, bronze bolts and strikes, brass hubs, and cases with specified finish.

2.1.3.2.1 Mortise Locksets

ANSI/BHMA A156.13, Series 1000, Grade 1, lever handles.

2.1.3.2.2 Cylinder Bored Locksets and Latchsets

ANSI/BHMA A156.2, Series 4000, Grade 1, lever handles.

2.1.3.3 Cylinders and Cores

ANSI/BHMA A156.5, Grade 1. Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Existing locks are Corbin Mortise Lock 8789L2 with MEDECO interchangeable core mortise cylinders #32W0200-R1-Biaxial-626 finish, with cam CT-Z01 keyed alike with 5 each control keys to be issued to the Westinghouse Hanford Company locksmith.

2.1.3.4 Lock Trim

Cast, forged, or heavy wrought construction and commercial plain design. In addition to meeting test requirements of ANSI/BHMA A156.2 and ANSI/BHMA A156.13, knobs, roses, and escutcheons shall be 0.050 inch thick if unreinforced. If reinforced, outer shell shall be 0.035 inch thick and combined thickness shall be 0.070 inch, except knob shanks shall be 0.060 inch thick.

2.1.3.5 Keys

Furnish two change keys for each lock. Furnish 5 control keys for each keyed-alike group of interchangeable core locks. Control keys to be furnished to the Westinghouse Hanford Company locksmith. Change keys to be furnished with each lock.

2.1.3.6 Exit Device

ANSI/BHMA A156.3, Type 1. No dogging. Von Duprin 99L Series, surface mounted exit device, 626 finish or duranodic (313) finish.

2.1.3.7 Closers

ANSI/BHMA A156.4, Surface Closer, Modern Type with Cover, Grade 1. Closing force PT 4C. Provide closers complete with brackets, arms, mounting devices, fasteners, and other features necessary for the particular application. Size closers in accordance with manufacturer's printed recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. In addition to the manufacturer's name or trademark, each closer shall bear the manufacturer's size designation where it will be visible after installation.

2.1.3.8 Overhead Holders

ANSI/BHMA A156.8, Overhead Surface Mounted Slide Type.

2.1.3.9 Flush Bolts

ANSI/BHMA A156.16, Lever Extension Flush. Top and Bottom bolts required.

2.1.3.10 Door Protection Plates

ANSI/BHMA A156.6, stainless steel.

Width for single doors shall be 2 inches less than door width; width for pairs of doors shall be one inch less than door width. Height of kick plates shall be 10 inches. Height of armor plates shall be not less than 48 inches. Height of mop plates shall be 6 inches.

2.1.3.11 Bumpers

ANSI/BHMA A156.16, Wall Type, Convex, Grade 1.

2.1.3.12 Silencers

ANSI/BHMA A156.16, for metal frames. Metal frames prepunched in accordance with Specification Section 08110, "Metal Doors and Frames".

2.1.3.13 Thresholds

ANSI/BHMA A156.21, extruded aluminum saddle with fluted top. Thresholds shall be provided for the full width of the opening. Threshold at Door 106B must be of sufficient width to cover joint in floor.

2.1.3.14 Weatherstripping

Weatherstripping shall consist of a 1/8 inch thick by 1 3/8 inches high neoprene, vinyl, silicone rubber, or polyurethane strip housed in an extruded, anodized aluminum housing not less than 0.050 inch thick by 1 1/4 inches high. A set shall include head and jamb seals.

2.1.3.15 Rain Drips

Extruded aluminum, not less than 0.080 inch thick, clear anodized. Set drips in sealant conforming to Specification Section 07900, "Sealants", and fasten with stainless steel screws. Door rain drips shall be approximately 1 1/2 inches high by 5/8 inch projection. Align bottom with bottom edge of door.

2.1.3.16 Automatic Door Bottom

Surface mounted, clear anodized extruded aluminum, 1/2 inch wide by 2 1/8 inches deep by the full width of the door. Attached to door with countersunk, stainless steel screws. Sill clearance shall be not less than 1/4 inch when door is opened. Gasket shall be silicone rubber or closed-cell sponge neoprene.

2.1.3.17 Astragal

Shop applied metal strip not less than 1/8 inch thick by 3 inches wide by the full height of the door. Permanently attached to active leaf of pair of doors without visible fasteners.

2.1.4 Fasteners

Provide fasteners of proper type, quality, size, quantity, and finish with hardware. Fasteners exposed to weather shall be stainless steel. Provide fasteners of type necessary to accomplish a permanent installation.

2.1.5 Ancillary Items

Provide accessories and special tools required to service and adjust hardware items.

2.1.6 Finishes

Hardware shall be finished in conformance to ANSI/BHMA A156.18 as follows:

Hinges (exterior)	630	Satin stainless steel
Hinges (interior)	626	Satin chromium plated
Locksets (exterior)	630	
Locksets (interior)	626	
Latchsets	626	
Closers	To match locksets	
Overhead Holders	To match locksets	
Flush Bolts	628	Satin aluminum, clear anodized
Thresholds	628	
Bumpers, rain drips, weather-stripping, automatic door bottoms	To match locksets	
Door Protection	630	
Silencers	Grey	
Key Cabinet	As selected by Buyer	

2.1.7 Key Cabinet and Control System

ANSI/BHMA A156.5, Wall Mounted System, Type E8331, Grade 1. Capacity (number of hooks) shall be 50 percent greater than the number of key changes used for door locks.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

(Not Used)

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Install hardware in accordance with manufacturer's printed instructions. Provide fasteners of the proper type, size, and number to fasten the hardware in place.

3.2.2 Temporary Construction Cores

Temporary construction cores shall be furnished, installed, and maintained in locks during construction and removed when directed.

3.2.3 Weatherstripping Installation

Handle and install weatherstripping so as to prevent damage. Provide full contact, weather-tight seals. Doors shall operate without binding.

3.2.3.1 Stop-Applied Weatherstripping

Fasten in place with color-matched sheet metal screws not more than 9 inches on centers after doors and frames have been finish painted.

3.2.4 Threshold Installation

Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws in expansion sleeves.

3.2.5 Hardware Locations

Hardware locations shall conform to SDI 100 unless otherwise indicated or specified.

3.2.5.1 Armor and Kick Plates

Push side of single-acting doors.

3.2.5.2 Mop Plates

Bottom flush with bottom of door.

Rev. 1

3.2.6 Key Cabinet and Control System

Locate where directed. Tag one set of file keys and one set of duplicate keys. Place other keys in appropriately marked envelopes, or tag each key. Furnish complete instructions for setup and use of key control system.

3.3 FIELD QUALITY CONTROL

Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Buyer.

3.4 ADJUSTMENTS

Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly.

3.5 CLEANING

(Not Used)

3.6 PROTECTION

After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of the work.

3.7 DEMONSTRATION

Demonstrate that permanent keys operate respective locks and give keys to the Buyer. Demonstrate that all hardware items operate properly and function as specified. Hardware items that do not perform properly shall be adjusted. Hardware items that do not perform properly after adjustment shall be replaced with new items at no additional cost to the Buyer.

3.8 SCHEDULES

3.8.1 Hardware Sets

HW-1 Deleted

HW-2 (Exterior doors: 110A, 110C, 110D, 110E)

1 1/2	Pair Hinges	A5111 x NRP
1	Exit Device	01 No Exterior Trim
1	Closer	C02011
1	Set Weatherstripping	As specified
1	Automatic Door Bottom	As specified
1	Rain Drip	As specified
3	Silencers	L03011

Rev. 1

HW-3 (Exterior doors: 106A, 124A)

1 1/2	Pair Hinges	A5111 x NRP
1	Lockset	F07
1	Closer	C02011
1	Threshold	J32100 Length as specified
1	Set Weatherstripping	As specified
1	Automatic Door Bottom	As specified
1	Rain Drip	As specified
3	Silencers	L03011

HW-4 (Exterior pairs of doors: 102B, 108B, 136A)

3	Pair Hinges	A5111 x NRP
2	Flush Bolts	L04081
1	Lockset	F07
1	Astragal	As specified
2	Closers	C02011
2	Armor Plates	J101
1	Set Weatherstripping	As specified
1	Automatic Door Bottom	As specified
2	Rain Drips	As specified
2	Silencers	L03011

HW-5 (Interior doors: 100A, 102A, 104A, 108A, 136B)

1 1/2	Pair Hinges	A2111 x NRP
1	Lockset	F81
1	Closer	C02011
1	Mop Plate	J103
1	Wall Bumper	L02101
3	Silencers	L03011

HW-6 (Interior communicating door: 106B)

1 1/2	Pair Hinges	A2111 x NRP
1	Lockset	F80
1	Closer	C02011
1	Kick Plate	J102
1	Wall Bumper	L02101
1	Threshold	J32100 Length as specified
1	Set Weatherstripping	As specified
1	Automatic Door Bottom	As specified
3	Silencers	L03011

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

Rev. 1

HW-7 (Toilet Room door: 116A)

1 1/2	Pair Hinges	A2111	
1	Latchset	F75	
1	Closer	C02011	
1	Mop Plate	J103	
1	Wall Bumper	L02101	
1	Threshold	J32120	Length as specified
3	Silencers	L03011	

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 09100
METAL STUD FRAMING SYSTEM
B-595-C-E350-09100

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 09100
METAL STUD FRAMING SYSTEM
B-595-C-E350-09100

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SECTION 09100 METAL STUD FRAMING SYSTEM

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing metal stud framing.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A525	1991 (Rev. A) General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
ASTM C645	1988 Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board
ASTM C754	1988 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board

1.3 RELATED REQUIREMENTS

Specification Section 09250 Gypsum Board

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

1.5.1 Metal stud framing system for walls, roof curbs, framing around interior columns and ceilings.

1.5.2 Design system to accommodate construction tolerances, deflection of building structural members and clearances of intended openings.

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Drawings and Product Data

Submit manufacturer's data and shop drawings for metal framing, furring, and ceiling suspension systems. Indicate layout, materials, sizes, thicknesses, and fastenings.

1.6.2 Manufacturer's Instructions

Submit printed instructions for the erection of metal framing, furring, and ceiling suspension systems.

1.6.3 Certified Material Test Reports

- A. Submit certification attesting that materials meet the requirements specified herein and in referenced publications.
- B. Submit test reports for all item with ASTM requirements.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Seismic Zone is 2B.
- B. Outside Design Temperature
 - 1) Maximum Design Temperature, 110°F
 - 2) Minimum Design Temperature, -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Provide steel materials for metal stud framing systems conforming to ASTM C645, and galvanized per ASTM A525.

2.1.1 Suspended and Furred Ceiling Systems

1-1/2" cold rolled channel supports; 7/8" furring channels.

2.1.2 Nonload-Bearing Wall Framing

Steel screw studs, 20 gauge minimum, 6" wide unless noted otherwise on drawings.

2.1.3 Structural Accessories

- A. "Z" shaped furring channels, 24 gauge minimum, in sizes as required.
- B. Hat shaped furring channels, 7/8" deep x 1-1/4" face width and 2-1/2" overall width, 20 gauge.
- C. Cold rolled channels, 16 gauge, 1-1/2" with 1/2" minimum flange.

2.1.4 Partition Reinforcement

Partition reinforcement shall be provided for support of plumbing fixtures, accessories, and electrical and mechanical equipment. Reinforcement shall consist of cut-to-length sections of runner track or cold-rolled channels extending at least 2 feet on each side of the opening and braced and fastened to studs in accordance with the manufacturer's directions.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

Inspect existing surfaces and conditions before starting work. Notify the Buyer of any condition which would prevent satisfactory installation.

3.2 INSTALLATION, APPLICATION AND ERECTION

Framing for attachment of gypsum wallboard shall conform to ASTM C754, manufacturer's instructions, and all applicable building codes.

3.2.1 Suspended Ceiling Systems

- A. Framing members shall be 7/8" furring channels, 16" O.C. unless noted otherwise. Provide 1-1/2" cold rolled channel supports at 4'-0" O.C. Attach furring channels with channel clips.

B. Hanger wire, minimum 8 gauge galvanized soft annealed wire at 48" O.C.

C. Laterally brace (with No. 12 wire) entire suspension system.

3.2.2 Non-load Bearing Wall Framing and Furring

A. Studs and drywall furring at walls, 24" on center typical.

B. At door jambs, provide double studs full height.

3.2.3 Furring Structural Steel Columns

Install metal framing as necessary around columns where indicated on the drawings for wall finish.

3.2.4 Erection Tolerances

Framing members shall be within the following limits:

A. Layout of walls and partitions: 1/4 inch from intended position.

B. Plates and runners: 1/8 inch in 10 feet from a straight line.

C. Studs: 1/8 inch in 10 feet out of plumb, not cumulative.

D. Face of framing members: 1/8 inch in 10 feet from a true plane.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

At completion of metal framing installation, remove all rubbish, excess materials and equipment from the building and site, leaving the area clean.

3.6 PROTECTION

(Not Used)

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

Rev. 1

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 09250
GYPSUM BOARD
B-595-C-E350-09250

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ___ NO X
QUALITY LEVEL I ___ II X
SAFETY CLASS 1 ___ 2 ___ 3 X 4 ___

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte (FOR JLD) 7/20/93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLD)
J. L. Datte Architectural Lead

7/20/93
Date

SECTION 09250
GYPSUM BOARD
B-595-C-E350-09250

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**SECTION 09250
GYPSUM BOARD**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing interior gypsum board.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C36	1985 (R 1988) Gypsum Wallboard
ASTM C475	1989 Joint Compound and Joint Tape for Finishing Gypsum Board
ASTM C630	1990 Water-Resistant Gypsum Backing Board
ASTM C840	1988 Application and Finishing Gypsum Board
ASTM C1002	1989 Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases
ASTM E84	1989 (Rev. A) Surface Burning Characteristics of Building Materials

1.3 RELATED REQUIREMENTS

Specification Section 07900 Sealants
Specification Section 09100 Metal Stud Framing System

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Manufacturer's Catalog Data

- A. Gypsum board
- B. Fasteners
- C. Joint treatment material
- D. Adhesive
- E. Metal or plastic trim
- F. Control joints

Submit for each type of gypsum board.

1.6.2 Certified Material Test Report (Submit for items with ASTM requirements only)

- A. Gypsum board
- B. Fasteners
- C. Joint treatment material
- D. Adhesive
- E. Metal or plastic trim
- F. Control joints

Submit for each type of gypsum board.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

Interior operating environment temperature range 72°F to 78°F.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Shall conform to the referenced specifications and standards and to the requirements specified herein.

2.1.1 Gypsum Wallboard

Shall meet requirements of ASTM C36 for regular board, and ASTM C630 for water-resistant board.

2.1.1.1 Sizes

48 inches wide, 5/8 inch thick, with tapered edges.

2.1.2 Joint Treatment Materials

Joint reinforcing tape and joint compound shall conform to ASTM C475.

2.1.2.1 Embedding Compound

Specifically formulated and manufactured for use in embedding tape at gypsum board joints and compatible with tape, substrate and fasteners.

2.1.2.2 Finishing or Topping Compound

Specifically formulated and manufactured for use as a finishing compound.

2.1.2.3 All-Purpose Compound

Specifically formulated and manufactured to serve as both a taping and a finishing compound and compatible with tape, substrate and fasteners.

2.1.2.4 Setting or Hardening Type Compound

Specifically formulated and manufactured for use with fiber glass mesh tape.

2.1.2.5 Joint Tape

Fiber glass mesh tape.

2.1.2.6 Screws

ASTM C1002, Type "G", Type "S" or Type "W" steel drill screws. Use specially designed steel screws as recommended by the gypsum board manufacturer for the screw application of gypsum board to gypsum board or to steel framing.

2.1.2.7 Corner Bead and Edge Trim

Fabricate from corrosion protected steel or plastic designed for its intended use. Flanges shall be free of dirt, grease, and other materials that may adversely affect the bond of joint treatment.

2.1.2.8 Water

Clean, fresh, and potable.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Delivery

Deliver materials in the original packages, containers, or bundles with each bearing the brand name, applicable standard designation, and name of manufacturer, or supplier.

3.1.2 Storage

Keep materials dry by storing inside a sheltered building. Provide adequate ventilation to prevent condensation.

3.1.3 Handling

Neatly stack gypsum board flat to prevent sagging or damage to the edges, ends, and surfaces.

3.1.4 Installation Conditions

3.1.4.1 Temperature

Maintain a uniform temperature of not less than 50°F in the structure for at least 48 hours prior to, during, and following the application of gypsum board and joint treatment materials.

3.1.5 Examination

3.1.5.1 Framing and Furring

Verify that framing and furring (Specification Section 09100, "Metal Stud Framing System") are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board. Verify that all blocking, headers and supports are in place to support plumbing fixtures and to receive grabbers and similar items. Do not proceed with work until framing and furring are acceptable for application of gypsum board.

3.2 INSTALLATION, APPLICATION AND ERECTION

Apply gypsum board to framing and furring members in accordance with ASTM C840, manufacturer's instructions, all applicable codes, and the requirements specified herein. Apply gypsum board with separate panels in moderate contact; do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length. Cut out gypsum board as required to make neat close joints around openings. In vertical application of gypsum board, provide panels in lengths required to reach full height of vertical surfaces in one continuous piece. Leave a space approximately 1/4 inch at bottom of gypsum board for sealant. Conceal fasteners in the finished work. Provide water-resistant gypsum backing board behind ceramic tile wainscot.

3.2.1 Finishing of Gypsum Board

Tape and finish gypsum board in accordance with ASTM C840. Provide joint, fastener depression, and corner treatment. Do not use fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

3.2.2 Sealant

Seal openings around pipes, fixtures, and other items projecting through gypsum board as specified in Specification Section 07900, "Sealants". Apply sealant material with exposed surface flush with gypsum board.

3.2.3 Patching

Patch surface defects in gypsum board to a smooth, uniform appearance, ready to receive finish as specified.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

At completion of wallboard installation, remove all rubbish, excess materials and equipment from the building and site, leaving the area clean.

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 09300
CERAMIC TILE
B-595-C-E350-09300

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/14/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 09300
CERAMIC TILE
B-595-C-E350-09300

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**SECTION 09300
CERAMIC TILE**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing ceramic tile.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.5	1985 Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
ANSI A108.10	1985 Installation of Grout in Ceramic Tile Installations
ANSI A118.1	1985 Dry-Set Portland Cement Mortar
ANSI A118.4	1985 Latex-Portland Cement Mortar
ANSI A137.1	1988 Ceramic Tile

1.3 RELATED REQUIREMENTS

(Not Used)

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Samples

- A. Ceramic floor tile
- B. Ceramic wall tile
- C. Ceramic tile trim units
- D. Coved base unit

1.6.1.1 Ceramic Floor Tile

12-inch square sheets, mounted; showing colors, finish, pattern, and form of each type, with joints between the tiles grouted.

1.6.1.2 Wall Tile

Sets of four tiles showing size, form, finish, and range and shades in each color, with joints between the tiles grouted.

1.6.1.3 Trim Units

Pieces of each unit, showing color, finish, and type.

1.6.2 Certificates of Compliance

A. Master Grade Certificate for ceramic tile

Submit a Master Grade Certificate for tile, certifying the grade, type, and quantity of material. Certified tile shall bear certification marks on cartons or labels. Submit certificates using the form cited in ANSI A137.1. In lieu of Master Grade Certificate and certification marks, a manufacturer's certificate of compliance may be submitted. The manufacturer's certificates must show that the tile meets the requirements of ANSI A137.1.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

Interior operating environment temperature range 72°F to 78°F.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Tile

ANSI A137.1, Standard Grade.

2.1.1.1 Color and Patterns

Tile colors and patterns shall be similar to:

Floor tile - American Olean #C17, Empire Gray
Wall tile - American Olean #05, Polar White

and as selected from the manufacturer's standard color samples. Colors and patterns indicated by reference to manufacturer's name and designations are for color and pattern identification only and are not intended to limit selection of other manufacturer's products with similar colors and patterns. Color selection shall be by the Buyer.

2.1.1.2 Floor Tile

Unglazed Ceramic Mosaic Tile: ANSI A137.1, with cushioned edges.

Nominal Facial Dimensions in inches: Nominal Thickness in inches:

2 by 2

1/4

2.1.1.3 Wall Tile

Glazed Wall Tile: ANSI A137.1, bright finish with cushioned edges.

Nominal Facial Dimensions in inches: Nominal Thickness in inches:

4-1/4 by 4-1/4

5/16

2.1.1.4 Trim Units

Provide matching trim units and accessories with tile work. Provide where indicated for a complete and finished installation. Identification numbers for trim unit shapes are cited in ANSI A137.1. Provide bullnose units for wainscots, except where wainscot is flush with abutting wall surface. Provide up-and-down corners with bullnose units where there is a break in wainscot height, or where the wainscot does not terminate against projecting construction. Provide coved base units for wainscots. Internal corners shall be squared and external corners rounded using appropriate matching trim units.

2.1.2 Mortars and Grouts

2.1.2.1 Mortar, Adhesives, and Tile Setting

A. Dry-Set Portland Cement Mortar: ANSI A118.1, factory sanded.

B. Latex-Portland Cement Mortar: ANSI A118.4.

2.1.2.2 Grout

A. Dry Set: ANSI A118.1, factory sanded.

B. Latex-Portland Cement: ANSI A118.4.

Seller has the option of using dry set or latex-Portland cement grout and mortars.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Examination

Do not start tile work until roughing in for plumbing, heating, ventilating, air conditioning, and electrical work has been installed and tested.

3.1.2 Concrete Subfloor Preparation

Do not begin floor tile installation in areas receiving wall tile until wall tile installation has been completed.

3.1.2.1 Slab on Grade Construction Where No Bending Stresses Occur

Prepare in accordance with ANSI A108.5.

3.1.3 Preparation of Mortar Mixes

Measure mortar materials in approved containers to ensure that proportions of materials will be controlled and accurately maintained. Measuring materials with shovels is not permitted. Unless specified otherwise, mix mortar in proportions by volume in approved mixing machines or mortar boxes. Control the quantity of water accurately and uniformly.

3.1.4 Delivery, Storage, and Handling

ANSI A108.5, Section A-1.

3.1.5 Installation Conditions

ANSI A108.5, Section A-1 as modified herein. Do not start tile work unless the ambient temperature in work area is at least 50°F and rising. Maintain the ambient temperature above 50°F while work is in progress and for at least three days after its completion. Do not use adhesive in unventilated areas.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Floor Tile

A. Dry-Set Mortar: ANSI A108.5.

B. Latex-Portland Cement Mortar: ANSI A108.5.

3.2.2 Wall Tile

Wall surfaces receiving ceramic tile set with dry-set mortar or latex-Portland cement mortar shall have square corners, be plumb and true, with variations not exceeding 1/8 inch in eight feet from the required plane.

A. Dry-Set Mortar: ANSI A108.5.

B. Latex-Portland Cement Mortar: ANSI A108.5.

3.2.3 Joints

Make parallel, plumb, level, and in alignment. Make end joints in broken-joint work on center lines of adjoining tiles, as far as practicable. Set square tiles with straight joints, and set oblong tiles with broken joints.

3.2.4 Joint Width

Make joints uniform in width and space to accommodate tile with a minimum of cutting, but maintain standard mounting widths between units abutting sheets of mounted ceramic tile. Make joint widths as follows:

A. Mounted Tile: As determined by the mounted tile spacing.

B. Unmounted Glazed Wall Tile: As determined by spacing lugs.

C. Trim Units: Match adjoining tile units.

Rev. 1

3.2.5 Grouting and Pointing Joints

White grout for walls. Gray grout for floors.

A. Grout tile in accordance with ANSI A108.10.

3.2.6 Cleaning

Clean in accordance with ANSI A108.5, Section A-3. Acid cleaning of unglazed tile, when necessary, shall be done no sooner than 14 days after setting tile.

3.2.7 Extra Stock

Supply an extra two percent of each type tile used in clean and marked cartons.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

A. Clean tile surfaces upon completion of grouting.

B. The Seller shall remove all excess material and debris from the project site.

3.6 PROTECTION

Meet the requirements of ANSI A108.5, Section A-3. Cover finished tile floors with clean, 30-pound natural kraft paper before permitting foot traffic. Place board walkways on floors that are to be continuously used as passageways by workers. Cover marble thresholds with boards. Protect tiled corners, external angles, with board corner strips in areas used as passageways by workers.

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 09651
RESILIENT SHEET FLOORING
B-595-C-E350-09651

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA	YES	___	NO	X
QUALITY LEVEL	I	___	II	X
SAFETY CLASS	1	___	2	___
			3	X
			4	___

ORIGINATOR:

CHECKER:

S. C. Sam
S. C. Sam, Assoc. Architect

7/20/93
Date

J. L. Datte
J. L. Datte, Architectural Lead

7-20-93
Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 09651
RESILIENT SHEET FLOORING
B-595-C-E350-09651

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**SECTION 09651
RESILIENT SHEET FLOORING**

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing resilient flooring and base.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E662 1983 Test for Specific Optical Density of
Smoke Generated by Solid Materials

FEDERAL SPECIFICATIONS (FS)

FS SS-W-40 1974 (Rev. A) (Notice 1) Wall Base:
Rubber, and Vinyl Plastic

FS P-W-155 1982 (Rev. C) (QPL) Wax, Floor, Water-
Emulsion

FS L-F-475 A (3) 1971 Vinyl Floor Covering Surface (Tile
and Roll) with Backing

1.3 RELATED REQUIREMENTS

Specification Section 01730 Operation and Maintenance Data

Specification Section 03300 Cast-In-Place Concrete

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

Rev. 1

- 1.6.1 Manufacturer's Catalog Data
 - A. Vinyl Sheet Flooring
 - B. Wall base
 - C. Adhesives
- 1.6.2 Drawings
 - (None Required)
- 1.6.3 Manufacturer's Installation Instructions
 - Submit for each type of flooring material.
- 1.6.4 Samples
 - A. Vinyl Sheet Flooring
 - B. Wall base
 - Submit for each color and pattern of each item.
- 1.6.5 Certificates of Compliance
 - A. Vinyl Sheet Flooring
 - B. Wall base
 - C. Adhesive
 - Submit for each type of material.
- 1.6.6 Maintenance Manuals
 - A. Manufacturer's written maintenance instructions in accordance with Specification Section 01730, "Operation and Maintenance Data".
- 1.7 **CLASSIFICATION OF SYSTEMS AND COMPONENTS**
 - (Not Used)
- 1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**
 - Interior operating environment temperature range 72°F to 78°F.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

The materials shall conform to the respective specifications and standards and to the requirements specified herein.

2.1.1 Color and Pattern

The color and pattern of the flooring shall be uniformly distributed throughout the thickness of the flooring. Resilient flooring materials of the same type, pattern, and color shall be of the same production run and shall be so marked. Variations in shades and off-pattern matches between containers are not acceptable. Flooring in a continuous area or replacement of damaged flooring in a continuous area shall be from the same production run and shall have the same shade and pattern. Color and pattern shall be selected from manufacturer's standard colors.

2.1.2 Vinyl Sheet Flooring

Complying with ASTM E662, 450 or less, and with F.S. L-F-475(A), Type 11, Grade A. Overall thickness 0.085" with wear surface of 0.050".

Armstrong "Classic Corlon" or equal.

2.1.3 Wall Base

The wall base shall be FS SS-W-40, Type I, rubber, or Type II, vinyl plastic; Class 1, vinyl chloride, or Class 2, vinyl acetate; Style B, cove, adjacent to resilient flooring. The base shall be 4 inches high, 0.08 inch thick, and shall be similar to Armstrong vinyl wall base No. 122, warm gray. Use a flexible base to conform to irregularities in the walls, partitions, and floors. Provide premolded corners in matching size, shape, and color for all right-angle inside and outside corners. Provide where called for on drawing finish schedule.

2.1.4 Adhesives

As recommended by the manufacturer.

2.1.5 Integral (Flash) Cove

Provide where called for on drawing finish schedule. Support with a cove stick with minimum radius of 7/8". Cap the integral cove with an approved cap strip.

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2.1.6 Crack Filler

2.1.6.1 Crack Filler for Floors

As recommended by the floor covering manufacturer.

2.1.6.2 Crack Filler for Walls

As recommended by the wall base manufacturer.

2.1.7 Finish

2.1.7.1 Wax

FS P-W-155.

2.1.8 Edging Strips

Beveled vinyl plastic, beveled rubber.

2.1.9 Delivery and Storage

Deliver materials to the job in the manufacturer's original, unopened containers with brands, names, and production runs clearly marked thereon. Handle materials carefully, and store them in their original containers at no less than 65°F for at least 48 hours prior to starting work. Do not open the containers until they are inspected and accepted by the Buyer.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

Do not install flooring on surfaces that are unsuitable for proper installation. Surfaces that are to receive flooring shall be clean, dry, smooth, firm, sound and free of oil, paint, wax, dirt, or other damaging materials.

3.1 PREPARATION

3.1.1 Concrete Floor Surfaces

Grind ridges and other uneven surfaces smooth. Concrete curing compounds, other than the types that do not adversely affect adhesive, shall be removed entirely from the slabs. Cut out and fill all cracks 1/16 inch wide and wider with a crack filler specified for this application. Provide a latex underlayment to fill the remaining holes, cracks, and depressions and for

smoothing, leveling, and feather-edging the concrete. Remove loose particles; vacuum chalky, dusty surfaces; and prime the cleaned surfaces, if recommended by the flooring manufacturer.

3.1.2 Moisture Test for Concrete Floors

As recommended by the floor covering manufacturer.

3.1.3 Installation Conditions

Maintain the temperature of spaces in which flooring work is to be performed at no less than 65°F at the floor level for at least 48 hours prior to starting the work, during the time the work is performed, and for at least 48 hours after the work is completed. Maintain a minimum temperature of 55°F, thereafter. Provide adequate ventilation to remove moisture and fumes from the area.

3.2 **INSTALLATION, APPLICATION AND ERECTION**

To avoid damaging the floor, install the flooring after other tradesmen in the same area have completed their work. Apply the flooring and the accessories in accordance with the manufacturer's installation procedure. The work shall be performed by workmen experienced in the application of such flooring. Detailed requirements are as follows:

- A. Adhesives: Apply adhesives in accordance with the adhesive manufacturer's printed directions. Smoking or the use of open flames or other immediate sources of ignition is strictly prohibited in the area where solvent-containing adhesives are being used or spread. Post conspicuous signs reading "NO SMOKING OR OPEN FLAME" in the area of the spread adhesive.
- B. Flooring: Install with a minimum of seams and in accordance with the manufacturer's written instructions.
- C. Cutting: Cut flooring to fit around permanent fixtures, built-in furniture, and pipes, and outlets. Cut flooring edges, fit the flooring, and scribe the flooring to the walls and partitions after the field flooring has been applied.
- D. Edge Strips: Provide edging strips where the flooring terminates at points higher than the contiguous finished flooring, except at doorways where thresholds are provided. Secure plastic/rubber strips with adhesive.

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3.2.1 Application of Vinyl Sheet Flooring

Apply only recommended adhesives to surfaces.

3.2.2 Application of Rubber and Vinyl Wall Base

Apply wall base after the flooring has been completed and the wall surface to which the base is to be applied is dry. Form inside and outside corners with base materials, as specified herein.

3.2.2.1 Surface Preparation

Fill cracks and voids in the wall with a crack filler specified for this application. Bring irregular surfaces to a smooth finish with a smoothing compound.

3.2.2.2 Wall Base

Apply base adhesive to the back of the base with a notched trowel, leaving approximately 1/4 inch bare space along the top edge of the base. Immediately press the base firmly against the wall, and move the base gently into place, making sure that the toe is in contact with the floor surface and the wall. Roll the entire vertical surface of the base with a hand roller, and press the toe of the base with a straight piece of wood to ensure proper alignment.

3.2.3 Extra Stock

Upon completion of work, deliver additional flooring and base to the Buyer for use in repairs and maintenance. Additional materials of each color shall be from the same production run as the materials installed. Furnish properly marked, in the following quantities and with the colors in the same proportions as the installed materials:

- A. Sheet Flooring: 10 linear feet of a full sheet width
- B. Wall base: 4 lineal feet
- C. Premolded inside base corners: 1 piece
- D. Premolded outside base corners: 1 piece

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 **CLEANING**

3.5.1 Upon completion of the installation, follow the flooring manufacturer's recommendations to remove surplus adhesive, and clean the flooring and adjacent surfaces. Five days after installing the flooring, wash the flooring with the flooring manufacturer's recommended cleaning solution; rinse the flooring thoroughly with cool, clean water, while avoiding flooding the floor; and finish the floor as specified in paragraph entitled, Finishing.

3.5.2 **Finishing**

Give the flooring two coats of wax, each coat buffed to an even luster with an electric polishing machine. Clean the bases but do not polish them.

3.6 **PROTECTION**

Protect flooring from all traffic for a period of 48 hours after installation to allow adhesive to properly set. From the time of laying the floor until its acceptance, protect the floor from damage.

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 09900
PAINTING
B-595-C-E350-09900

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0884 & CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/29/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-29-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte (FOR JLD)
J. L. Datte Architectural Lead

7-29-93
Date

SECTION 09900
PAINTING
B-595-C-E350-09900

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ATTACHMENTS

<u>ATTACHMENT</u>	<u>TITLE</u>
A	STANDARD SPECIFICATION FOR IDENTIFICATION OF PIPING SYSTEMS

SECTION 09900 PAINTING

PART 1 GENERAL

1.1 SUMMARY

- A. This section covers technical requirements for the preparation of surfaces and the furnishing and application of all paints.
- B. The term "Paint" as used herein, includes emulsions, enamels, paints, stains, varnishes, sealers, emulsion filler, and other coatings, whether used as prime, intermediate, or finish coats.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC S329 1985 Specification for Structural Joints
Using ASTM A325 or ASTM A490 Bolts
(Allowable Stress Design)

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1558 1981 Paint, Stencil

FEDERAL SPECIFICATIONS (FS)

FS QPL-TT-E-489 1992 (Rev. 37) Qualified Products List of
Products Qualified Under Federal
Specification TT-E-489H; Alkyd, Gloss
(for Exterior and Interior Surfaces), Low
VOC

FS TT-E-505 1985 (Rev. B) Enamel (Odorless, Alkyd,
Interior, High Gloss)

FS TT-E-509 1986 (Rev. C) Enamel, Odorless, Alkyd,
Interior, Semigloss, White and Tints

FS TT-E-545 1986 (Rev. C) Primer (Enamel-Undercoat,
Alkyd, Odorless, Interior, Flat, Tints
and White)

Rev. 1

FS TT-P-19 1985 (Rev. D) Paint, Latex (Acrylic
Emulsion, Exterior Wood and Masonry)

FEDERAL STANDARD (FED-STD)

FED-STD 595B 1989 Colors Used in Government
Procurement

MILITARY SPECIFICATIONS (MIL)

MIL-C-83286 1987 (Rev. B) (Notice 1) (Amd. 2)
Coating, Urethane, Aliphatic Isocyanate,
for Aerospace Applications

MIL-P-24351 1985 (Rev. A) Primer Coating, Alkyd, Blue
(Formula No. 6N35-2)

MIL-P-24441/1 1991 (Rev. C) Paint, Epoxy-Polyamide,
Green Primer, Formula 150, Type I

MIL-P-28577 1988 (Rev. B) Primer, Water-Borne,
Acrylic or Modified Acrylic, for Metal
Surfaces

MIL-P-28578 1988 (Rev. B) Paint, Water-Borne, Acrylic
or Modified Acrylic, Semigloss, for Metal
Surfaces

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Paint-1 1982 Shop, Field, and Maintenance
Painting

SSPC PA-2 1982 Measurement of Dry Paint Thickness
with Magnetic Gauges

SSPC SP-1 1985 Solvent Cleaning

SSPC SP-2 1982 Hand Tool Cleaning

SSPC SP-3 1982 Power Tool Cleaning

SSPC SP-6 1989 Commercial Blast Cleaning

SSPC SP-7 1985 Brush-Off Blast Cleaning

SSPC SP-10 1989 Surface Preparation Spec. No. 10
Near-White Blast Cleaning

SSPC VIS 1 1989 Visual Standard for Abrasive Blast
Cleaned Steel (Standard Reference
Photographs)

1.3 **RELATED REQUIREMENTS**

Specification Section 05120 Structural Steel

Specification Section 15061 Piping Material, Fabrication,
Erection and Pressure Testing
(Carbon Steel, Iron and
Nonmetallic)

1.4 **DEFINITIONS**

DFT - Refers to the minimum dry film thickness of coatings which
are applied.

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and
Data Requirements Section of the Order/Subcontract:

1.6.1 **Materials List**

List of items proposed to be provided under this section.

1.6.2 **Manufacturer's Specifications**

Specifications and data sheets necessary to prove compliance with
the specified requirements.

1.6.3 **Material Safety Data Sheets (MSDS)**

MSDS for all materials considered hazardous, toxic or
carcinogenic, including those so identified by the following
entities:

A. Federal Occupational Safety and Health Administration (OSHA).

B. State of Washington Regulatory Agencies.

1.6.4 **Manufacturer's Instructions**

A. Paint application instructions

1.6.5 Evidence of Acceptable Variation

If a product proposed for use does not conform to requirements of the referenced specification, submit for approval to the Buyer, evidence that the proposed product is either equal to or better than the product specified. The submittal shall include the following:

- A. Identification of the proposed substitute;
- B. Reason why the substitution is necessary;
- C. A comparative analysis of the specified product and the proposed substitute, including tabulations of the composition of pigment and vehicle;
- D. The differences between the specified product and the proposed substitute; and
- E. Other information necessary for an accurate comparison of the proposed substitute and the specified product.

1.6.6 Certificates of Compliance

For each type of coating, or other product furnished, submit a certificate from the manufacturer stating that the product conforms to requirements of the referenced specification. If the referenced specification has a Qualified Products List (QPL), certify that the product has been tested and approved for inclusion in the QPL.

1.6.7 Deleted.

1.6.8 Extra Stock

1.6.8.1 Upon completion of the painting work, deliver to the Buyer an extra stock of paint equaling approximately 10 percent of each color used in each coating materials used.

1.6.8.2 Extra stock shall be tightly sealed in clearly labeled containers.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

- A. Site Elevation 714 feet above sea level
- B. Barometric Pressure 14.3 psia

C. Outside Design Temperature

- | | | |
|----|-----------------------------|-------|
| 1) | Maximum Design Temperature | 110°F |
| 2) | Minimum Design Temperature | -20°F |
| 3) | Wet Bulb Design Temperature | 68°F |

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 General

Conform to the specifications and standards referenced in PART 3. For materials specified that are on the Qualified Products List (QPL), the material provided shall have been tested and approved for inclusion in the QPL.

| 2.1.2 Deleted.

| 2.1.2.1 Deleted.

| 2.1.2.2 Deleted.

| 2.1.2.3 Deleted.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

Remove dirt, splinters, loose particles, grease, oil, and other substances deleterious to coating performance as specified for each substrate.

3.1.1 Preparation - Metal Surfaces

3.1.2 Ferrous Surfaces

A. Shop-Coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean in accordance with SSPC SP1 to remove oil and grease. Where shop coat is missing or damaged, clean according to SSPC SP6 or SSPC SP10. Use inhibitor as recommended by coating manufacturer to prevent premature rusting.

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- B. Surfaces With More Than 20 Percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with SSPC SP10.

3.1.3 Final Ferrous Surface Condition:

Cleaned surface shall be similar to photographs in SSPC VIS1 as follows:

<u>Degree of Cleaning</u>	<u>Adherent Mill Scale</u>	<u>Rusting Mill Scale</u>	<u>Rusted</u>	<u>Fitted and Rusted</u>
Hand Tool Cleaning SSPC SP2	(1)	B St 2	C St 2	D St 2
Power Tool Cleaning SSPC SP3	(1)	B St 2	C St 3	D St 3
Commercial Blast Cleaning SSPC SP6	(1)	(1)	C Sa 2	D Sa 2
Brush-Off Blast Cleaning SSPC SP7	(1)	B Sa 1	C Sa	D Sa
Near White Blast Cleaning SSPC SP10	A Sa 2-1/2	B Sa 2-1/2	C SA 2-1/2	D Sa 2-1/2

NOTE: (1) No photograph is available or recommended for comparison.

3.1.4 Galvanized Surfaces

New Galvanized: Solvent clean in accordance with SSPC SP1.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Coating Application

Apply coating materials in accordance with SSPC Paint-1. SSPC Paint-1 methods are applicable to all substrates, except as modified herein. Thoroughly work coating materials into joints, crevices, and open spaces. Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.

- A. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying. Provide each coat in specified condition to receive the next coat.

- B. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by the manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover the surface of the preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.
- C. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

3.2.2 Equipment

Apply coatings with approved brushes, approved rollers, or approved spray equipment, unless specified otherwise. Spray areas made inaccessible to brushing by items such as ducts and other equipment.

3.2.3 Thinning of Paints

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory for the type of paint being used. Obtain written permission from the Buyer to use thinners. The written permission shall include quantities and types of thinners to use.

3.2.4 Coating Systems

- A. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

Table

- I Exterior Metal Surfaces
- II Interior Metal Surfaces
- III Building Systems Surfaces: Interior and Exterior
- IV Interior Wallboard Surfaces

- B. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.
- C. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.

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D. Edges of Field Cut Steel, Metal Roof, Metal Siding and All Surfaces Damaged During Performance of the Work: Coat surfaces with the following:

- 1) One coat of primer.
- 2) One coat of undercoat or intermediate coat.
- 3) One top coat to match adjacent surfaces.

3.2.4.1 Coating Systems

TABLE - I
EXTERIOR METAL SURFACES

	SURFACE/AREA	PRIMER	DFT	INTERMEDIATE COAT	DFT	TOPCOAT	DFT
***** FERROUS SURFACES *****							
A.	New Steel that has been Blasted to SSPC SP10	MIL-P-24441/1 Form. 150	3.0	MIL-P-24441/1 Form. 150	3.0	MIL-C-83286	2.0
B.	Structural Steel clean to SSPC SP-10	MIL-P-24441/1 Form. 150 Meeting AISC S329*	2.0	MIL-P-24441/1 Form. 150	3.0	MIL-C-83286	2.0
C.	Deleted						
***** GALVANIZED SURFACES *****							
D.	New Galvanized Surfaces	MIL-P-28577	2.5	N/A		MIL-P-28578	1.5
***** SURFACES NOT SPECIFIED OTHERWISE *****							
E.	Other Metal, except Roof Surfaces, Not Specified Otherwise	MIL-P-24351 1 coat on shop primed surfaces and 2 coats on non-shop primed surfaces	2.0	FS QPL-TT-E-489	1.5	FS QPL-TT-E-489	1.5

*Refer to Paragraph 3.2.5, A-3.

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TABLE - II
INTERIOR METAL SURFACES

	SURFACE/AREA	PRIMER	DFT	INTERMEDIATE COAT	DFT	TOPCOAT	DFT
A.	Metal in Interior	MIL-P-24351	2.0	FS TT-E-545	1.5	FS TT-E-509	1.5
B.	Structural Steel Clean to SSPC SP10	MIL-P-24351 Meeting AISC S329*	2.0	N/A		FS TT-E-509	1.5

*Refer to Paragraph 3.2.5, A-3.

TABLE - III
BUILDING SYSTEMS SURFACES: INTERIOR AND EXTERIOR

	SURFACE/AREA	PRIMER	DFT	INTERMEDIATE COAT	DFT	TOPCOAT	DFT
1.	Mechanical, Electrical, and Miscellaneous Metal Items, Except Hot Metal Surfaces and New Prefinished Equipment: Prefinishing of new mechanical and electrical equipment is specified in the section covering the particular item. Paint copper pipe exposed in interior spaces.						
A.	Surfaces Not Adjacent to Painted Surfaces	MIL-P-24351	2.0	FS QPL-TT-E-489	1.5	FS QPL-TT-E-489	1.5
B.	Surface Adjacent to Painted Surfaces	Coating systems as specified. Color of topcoat to match adjacent surfaces. 1.5 mils dry film thickness for each coat.					
C.	Carbon Steel Piping, Insulated	Per Spec Section 15061		None		None	
D.	Carbon Steel Piping, Miscellaneous Pipe Support Elements, Not Insulated and Protruding Through Insulation	Per Section 15061		Amercoat 185 or equal	3.0	Amercoat 33 or equal	3.0
E.	Deleted						

NOTE: Weld areas and other areas with damaged primer and bare areas shall be wire brushed per SSPC SP-2 prior to application of intermediate coat.

TABLE - IV
INTERIOR WALLBOARD SURFACES

	SURFACE/AREA	PRIMER	DFT	INTERMEDIATE COAT	DFT	TOPCOAT	DFT
A.	Wallboard	FS TT-P-19	1.5	N/A		FS TT-E-509	1.5
B.	Wallboard (Moisture Resistant)	FS TT-P-19	1.5	N/A		FS TT-E-505	1.5

3.2.5 Coating Systems for Metal

- A. Primer: Apply specified ferrous metal primer on the same day that surface is cleaned. If flash rusting occurs, re-clean the surface prior to application of primer.
- 1) Inaccessible Surfaces: Prior to erection, use two coats of the specified primer on metal surfaces that will be inaccessible after erection.
 - 2) Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.
 - 3) Structural Steel: Provide coatings classified as Class A which provide a mean slip coefficient not less than 0.33 per AISC S329, Bolted Joints.
- B. Apply coatings of Tables I, II, III and IV. "DFT" means dry film thickness in mils.

3.2.6 Piping and Conduit Identification

Piping And Conduit Identification, Including Surfaces In Concealed Spaces: Provide in accordance with Attachment A. Place stenciling in clearly visible locations. On piping and conduits not covered by Attachment A, stencil approved names or code letters, in letters a minimum of 1/2 inch high for piping and a minimum of 2 inches high elsewhere. Stencil arrow-shaped markings on the piping and conduit to indicate the direction of flow. Use black stencil paint, CID A-A-1558.

3.2.7 Environmental Conditions

3.2.7.1 Exterior Coatings

Do not apply coating to surfaces during foggy or rainy weather, or under the following surface temperature conditions:

- A. Less than 5°F above the dew point of the surrounding air.

- B. Below 40°F (for oil-based paints), 50°F (for water-base paints or over 95°F, unless approved by the Buyer.

3.2.7.2 Interior Coatings

Apply coatings when surfaces to be painted are dry and the following surface temperatures can be maintained:

- A. Between 65 and 95°F during the application of enamels;
- B. Between 50 and 95°F during the application of other coatings.

3.2.7.3 Color Selection

Colors of finish coats shall be as indicated (color numbers are from FED-STD 595B). Colors shall be submitted for approval. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements.

3.2.8 Location and Surface Type to be Painted

3.2.8.1 Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise:

- A. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.
- B. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.
- C. Existing coated surfaces that are damaged during performance of the work.

3.2.8.2 Painting Excluded

Do not paint the following unless indicated otherwise:

- A. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.
- B. Surfaces in concealed spaces. Concealed spaces are defined as furred spaces and chases.

- C. Steel to be embedded in concrete.
- D. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.

3.2.8.3 Exterior Painting

Includes all building surfaces and appurtenances as indicated.

3.2.8.4 Interior Painting

Includes all building surfaces and appurtenances as indicated. Where a space or surface is indicated to be painted, include the following items, unless indicated otherwise:

- A. Exposed columns, girders, beams, and joists.
- B. Metal doors and frames.
- C. Gypsum board (walls and ceilings).

3.2.8.5 Mechanical and Electrical Painting

Includes field coating of interior and exterior surfaces.

- A. Where a space or surface is indicated to be painted, include the following items unless indicated otherwise:
 - 1) Exposed piping, conduit, and ductwork;
 - 2) Supports, hangers, air grilles, and registers;
 - 3) Miscellaneous metalwork and insulation coverings.
- B. Do not paint the following, unless indicated otherwise:
 - 1) New zinc-coated, aluminum, and copper surfaces under insulation;
 - 2) New aluminum jacket on piping; and

3.2.8.6 Color Coding of Utility Pipes

Color Coding For Utility Pipes: Paint the pipe in accord with Attachment A.

3.3 FIELD QUALITY CONTROL

- A. Dry film thickness (DFT) shall be verified by inspection per SSPC PA-2.

- B. In addition to meeting the previously specified requirements, demonstrate the mobility of moving components, including but not limited to swinging doors, for inspection by the Buyer. Perform this demonstration after appropriate curing and drying times of the coatings have elapsed and prior to invoicing for final payment.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

On completion of the work, Seller shall remove all excess material and debris from the project site.

3.6 **PROTECTION OF AREAS AND SPACES**

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

**ATTACHMENT A
STANDARD SPECIFICATION FOR
IDENTIFICATION OF PIPING SYSTEMS**

1.0 GENERAL

The identification of piping systems shall be in accordance with American Standard Scheme for the Identification of Piping Systems, ANSI A13.1, as supplemented herein.

2.0 LOCATION

2.0.1 Except as provided below, identification shall be located adjacent to outlets, valves, flanges, unions, changes-in-direction, where pipes pass through walls, floors, or ceilings, and along an uninterrupted length of pipe at maximum intervals of 50 feet. Each line or branch in a room shall have at least one identification.

2.0.2 Where a number of outlets, valves, flanges, unions, or changes of direction make identification at each item impracticable, they may be spaced at approximately 6 foot intervals, preferably adjacent to valves.

2.0.3 For WATER SPRINKLER FIRE PROTECTION SYSTEMS, only feed mains, cross mains, and risers 3-inch nominal diameter and larger shall be identified. Line identification shall be located at test and drain valves; on each side of partitions, floors, and ceilings; and along uninterrupted lengths of pipe at maximum intervals of 50 feet. For other types of fire protection systems, identification shall be located as specified in Paragraph 2.0.1.

2.0.4 Legend shall be located on the pipe so that it can be read easily from the operator's normal viewing position. Labels shall be placed on the readily visible lower quadrant of overhead pipes, and on an upper quadrant of pipes below normal eye level. Above ceilings, labels shall be placed in locations most readily visible from access positions.

3.0 LEGEND

3.0.1 Positive identification of a piping system content shall be by lettered legend giving the name of the content in full or abbreviated form. Legends may also be as specified on drawings or in other specifications.

3.0.2 Abbreviation of words in the legend may be used only where unavoidable due to space limitations.

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- 3.0.3 The legend shall include the nominal operating pressure for steam, compressed air, and, when specified, the pressure or temperature for other materials.
- 3.0.4 Legend for refrigerant shall include the number of the refrigerant; for example, Refrigerant 12.
- 3.0.5 An arrow indicating the direction of flow shall be placed near the legend on pipes normally having a flow in one direction only. The color and size of the arrow shall be consistent with the color and size of the legend letters.
- 3.0.6 Legend shall be located on or adjacent to the classification color band.

4.0 APPROVED LABELS

- 4.0.1 Legend and color classification may be accomplished by the use of approved labels conforming to this Standard Specification and which are suitable for the temperature of the surface to which they are to be applied. Approved labels include the following:

ALL-TEMPERATURE PIPE MARKERS
W.H. Brady Company
727 West Glendale Avenue
Milwaukee, Wisconsin 53201

- 4.0.2 Single-word labels may be combined to form complete legends. Individual letter labels shall not be so combined.
- 4.0.3 Labels shall be installed after painting is complete.

5.0 CLASSIFICATION COLOR

- 5.0.1 When use of classification colors is specified, they shall conform to Table I.

TABLE I

<u>CLASSIFICATION</u>	<u>BAND OR LABEL COLOR</u>	<u>LEGEND/ ARROW COLOR</u>	<u>APPROXIMATE COLOR NO. PER FEDERAL STD. NO. 595</u>
Fire Protection	Red	White (17875)	11105 (red)
Dangerous	Yellow	Black (17038)	13655 (yellow)
Safe	Green	Black (17038)	14260 (green)
Life Support	Blue	White (17875)	15102 (blue)

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5.0.2 Classification colors for commonly used materials shall conform to Table II, following:

TABLE II
CLASSIFICATION COLORS FOR COMMONLY USED MATERIALS

<u>MATERIAL</u>	<u>COLOR</u>	<u>MATERIAL</u>	<u>COLOR</u>
Acetylene	Yellow	Nitrogen-Hydrogen, Mixed	Yellow
Air	Green*	Oil, Fuel	Yellow
Air, Breathing	Blue	Oil, Hydraulic	Yellow
Ammonia	Yellow	Oil, Tempering	Green#
Argon	Green*	Oxalic Acid	Yellow
Boiler Blow-Off	Yellow	Oxygen	Yellow
Boiler Feed Water	Yellow	Phosphoric Acid	Yellow
Brine, Sodium Chloride	Green#	Propane	Yellow
Butane	Yellow	Sewer, Chemical Waste	Yellow
Carbon Dioxide, Fire	Red	Sewer, Contaminated	Yellow
Carbon Dioxide, Process	Yellow	Sewer, Sanitary	Yellow
Carbon Tetrachloride	Yellow	Sodium Carbonate	Green#
Chemical Feed, Phosphate	Yellow	Sodium Dichromate	Green#
Chemical Feed, Sulphite	Yellow	Sodium Hydroxide	Yellow
Chlorine	Yellow	Sodium Silicate	Green#
Condensate	Yellow	Sodium Thiosulfate	Yellow
Refrigerant	Green*	Steam	Yellow
Gasoline	Yellow	Sulfur Dioxide	Yellow
Glycol, Ethylene	Green#	Sulfuric Acid	Yellow
Helium	Green*	Vacuum, Air Sampling	Yellow
Hydrochloric Acid	Yellow	Vacuum, Laboratory	Yellow
Hydrofluoric Acid	Yellow	Vacuum, Process	Yellow
Hydrofluoric Acid Gas	Yellow	Water, Distilled	Green#
Hydrogen	Yellow	Water, Fire Protection	Red
Hydrogen Iodide	Yellow	Water, Hydraulic	Green#
Methane	Yellow	Water, Process	Green#
Mixed Acid	Yellow	Water, Raw	Green#
Nitric Acid	Yellow	Water, Safety Shower	Green
Nitrogen	Green*	Water, Sanitary	Green#
		Water, Hot Sanitary	Yellow

* Yellow for pressure above 30 psig
Yellow for pressure above 125 psig

U.S. DEPARTMENT OF ENERGY
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Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 10200
METAL WALL LOUVERS
B-595-C-E350-10200

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7-20-93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7-20-93
Date

SECTION 10200
METAL WALL LOUVERS
B-595-C-E350-10200

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SECTION 10200 METAL WALL LOUVERS

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing metal wall louvers.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION, INC. (AMCA)

AMCA 500 1989 Test Method for Louvers, Dampers and Shutters

AMCA 511 1981 Certified Ratings Program for Air Control Devices

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A366/A366M 1985 Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality

ASTM A525 1986 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

ASTM A527 1985 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality

1.3 RELATED REQUIREMENTS

Specification Section 07465 Metal Wall System

Specification Section 07600 Flashing and Sheet Metal

Specification Section 07900 Sealants

1.4 DEFINITIONS

(Not Used)

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1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 **Manufacturer's Catalog Data**

1.6.2 **Drawings**

Show all information necessary for fabrication and installation of louvers. Indicate materials, sizes, thicknesses, fastenings, and profiles.

1.6.3 **Finish Color**

Samples of finished material in color matching adjacent wall surface.

1.6.4 **Certified Material Test Report (CMTR)**

- A. Submit CMTR for ASTM items.
- B. Submit certificate attesting that wall louvers and accessories meet the requirements of these specifications and the Contract Drawings.

1.7 **CLASSIFICATION OF SYSTEMS AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

- A. The effects of snow drifts shall be considered. Minimum snow load: 20 psf
- B. Basic wind speed at standard height of 33 feet: 70 mph
- C. Rainfall Intensity: Maximum of 1" in 24 hour period
- D. Outside Design Temperature: Maximum 110°F, Minimum -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Galvanized Steel Sheet

ASTM A527, galvanized in accordance with ASTM A525, coating designation G90.

2.1.2 Metal Wall Louvers

Weather resistant type, with bird screens (5/8" x 5/8" mesh) and made to withstand a wind load of not less than 30 pounds per square foot. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 and AMCA 511. The rating shall show a water penetration of 0.20 or less ounce per square foot of free area at a free velocity of 800 feet per minute.

2.1.3 Formed Metal Louvers

Formed of zinc-coated sheet not thinner than 16 U.S. gauge.

2.1.4 Screens and Frames

For steel louvers, provide 1/2 inch square mesh, 12 or 16 gauge zinc-coated steel; or 1/2 inch square mesh, 16 gauge copper. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.1.5 Fasteners and Accessories

Provide stainless steel screws and fasteners for steel louvers. Provide other non-corrosive accessories as required for complete and proper installation.

2.1.6 Finishes

Factory finished after assembly with Kynar 500, 70 percent resin coating system. Color to match adjacent metal siding of building.

2.2 FABRICATION AND MANUFACTURE

Fabricate steel louvers and frames to sizes and shapes indicated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Check framed opening for dimension, levels and rigidity.
- B. Assure that openings are free from irregularities which would interfere with installation.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 Wall Louvers

Install using stops or moldings, flanges, strap anchors, or jamb fasteners as appropriate for the wall construction and in accordance with manufacturer's recommendations and approved drawings.

3.2.2 Coordination

Coordinate installation work closely with work of other trades.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

(Not Used)

3.6 PROTECTION

3.6.1 Metal

Paint metal in contact with concrete with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULES

(Not Used)

END OF SECTION

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Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 10800
TOILET ACCESSORIES
B-595-C-E350-10800

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0859
ISSUE DATE 8/4/93

WAPA YES ☐ NO ☒
QUALITY LEVEL I ☐ II ☒
SAFETY CLASS 1 ☐ 2 ☐ 3 ☒ 4 ☐

ORIGINATOR:

CHECKER:

S. C. Sam 7/20/93
S. C. Sam, Assoc. Architect Date

J. L. Datte 7.20.93
J. L. Datte, Architectural Lead Date

APPROVED BY:

J. L. Datte
J. L. Datte Architectural Lead

7.20.93
Date

SECTION 10800
TOILET ACCESSORIES
B-595-C-E350-10800

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SECTION 10800 TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

This section covers the technical requirements for furnishing and installing toilet accessories.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-2380 1981 Dispenser, Paper Towel

FEDERAL SPECIFICATIONS (FS)

FS DD-M-00411 1990 (Rev. C) (Amd. 1) Mirrors, Glass

FS WW-H-1911 1978 (Rev. A) Holder, Toilet Paper (Single Roll)

FS WW-P-541/8 1990 (Rev. B) (Amd. 1) Plumbing Fixture (Accessories, Land Use) (Detail Specification)

1.3 RELATED REQUIREMENTS

Specification Section 09250 Gypsum Board

Specification Section 09300 Ceramic Tile

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract:

1.6.1 Manufacturer's Catalog Data

A. Accessories

Submit for each type of accessory specified. Include descriptions of materials, finishes, fastening and anchoring devices, and appurtenances.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

(Not Used)

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Fabricate accessories in accordance with commercial practice, with welds ground smooth. Bend, flange, draw, form, and perform similar operations in a manner to ensure no defects. Flanges of recessed accessories to return to walls to provide a continuous, tight-against-the-wall installation. Doors shall be warp free. Key manufacturer's standard locks alike, for groups of accessories; two keys furnished for each group.

2.1.2 Finishes

Finishes on metals not specified otherwise shall be provided as follows:

Metal

Finish

Corrosion-Resisting Steel
(Stainless Steel)

General-Purpose Polished

Aluminum

Satin Anodic, Clear

Carbon Steel

Bright Chromium Plate

Copper Alloy (Brass)

Bright Chromium Plate

Zinc Alloy

Bright Chromium Plate

2.1.3 Manufactured Units

2.1.3.1 Toilet Tissue Dispensers (Surface Mounted)

2.1.3.2 Type II, Roller Mounted on Single Continuous Bracket

FS WW-H-1911, chromium plated steel. Holder shall consist of wall plate with one stationary or integral post and one hinged post.

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Fix a roller or bar to the stationary post. The holder shall be antipilfering type.

2.1.3.3 Combination Paper Towel Dispenser/Waste Receptacle Units

A semi-recessed type. Dispenser shall have a capacity of 400 sheets of any type paper towels. Waste receptacle shall be designed for locking in unit and removing for service. Waste receptacle shall have a capacity of 12 gallons. Units shall be fabricated from 22-gauge stainless steel welded construction with all exposed surfaces to have satin finish. Provide waste receptacle with reusable liner of the type standard with the unit manufacturer.

2.1.3.4 Soap Dispensers

Waterless paste, integral refillable container with 40 fluid ounce capacity of stainless steel.

2.1.3.5 Mirrors

Class 2, Style E, Grade 2 (18 inches x 30 inches), electrocopper plated, conforming to FS DD-M-00411, mirror and back shall be standard with the manufacturer.

2.1.3.6 Seat Cover Dispenser

FS WW-P-541/8, Type I, Class 2 seat cover only Style R, recessed mounted and shall have a capacity of 200 seat covers.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Field Measurements

Field measurements shall be taken prior to the preparation of drawings and fabrication to ensure proper fits.

3.1.2 Mounting Devices and Fasteners

Concealed mounting devices and fasteners for accessories shall be fabricated from the same materials as the accessories or from galvanized steel. Exposed mounting devices and fasteners shall be finished to match the accessories. Fasteners shall be the theft-resistant type.

3.2 INSTALLATION, APPLICATION AND ERECTION

3.2.1 General

Installation of toilet accessories shall be in accordance with the manufacturer's written instructions.

3.2.2 Attachment

Accessories shall be secured to the supporting substrates with anchors of the types indicated by the following substrate construction:

3.2.2.1 Tile Cemented on Gypsum Board Wall

Accessories shall be secured with toggle bolts using not less than No. 10-24 screws of the length required for the finish thickness.

3.2.2.2 Gypsum Board

Accessories shall be secured with toggle bolts. Toggle bolts shall be not less than No. 10-24 screws of the length required for the finish thickness.

3.3 FIELD QUALITY CONTROL

(Not Used)

3.4 ADJUSTMENTS

(Not Used)

3.5 CLEANING

Surfaces of the work, and adjacent surfaces soiled as a result of the work, shall be cleaned in an approved manner. Equipment, surplus materials, and rubbish from the work shall be removed from the site.

3.6 PROTECTION

Protect toilet accessories before, during, and after installation in an approved manner. Damaged and unacceptable portions of completed work shall be removed and replaced with new work at no additional cost to the Buyer.

3.7 DEMONSTRATION

(Not Used)

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3.8 SCHEDULES
(Not Used)

END OF SECTION

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FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 13088
CANISTER/OVERPACK - STORAGE TUBE ASSEMBLIES
B-595-C-E350-13088

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-859 & DCN-0045
| ISSUE DATE 8/4/93

WAPA	YES	<u> </u>	NO	<u>X</u>
QUALITY LEVEL	I	<u>X</u>	II	<u> </u>
SAFETY CLASS	1	<u>X</u>	2	<u> </u>
			3	<u> </u>
			4	<u> </u>

ORIGINATOR:

CHECKER:

CJW for 7-14-93
R. L. Fages, Mechanical Engineer Date

D. A. Buzzelli 7-14-93
D. A. Buzzelli, Lead Disc. Checker Date

APPROVED BY:

C. J. Divona
C. J. Divona Lead Discipline Engineer

7-14-93
Date

SECTION 13088
CANISTER/OVERPACK - STORAGE TUBE ASSEMBLIES
B-595-C-E350-13088

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SECTION 13088
CANISTER/OVERPACK - STORAGE TUBE ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

This specification section describes the minimum technical requirements for the fabrication, inspection, testing and handling of the storage tube assemblies. These assemblies include: 1) top tube funnel; 2) tube (including bellows); 3) tube base; 4) tube gauges and impact absorber gauges; and 5) lifting device.

1.2 REFERENCES

The publications listed below form a part of this specification section to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B31.3	1990 Chemical Plant and Petroleum Refinery Piping
ANSI Y14.36	1978 (Rev. 87) Surface Texture Symbols
ANSI Y14.5M	1982 Dimensioning and Tolerancing

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A240	1991 (Rev. A) Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
ASTM A242/A242M	1991 (Rev. A) Standard Specification for High-Strength Low-Alloy Structural Steel
ASTM A588/A588M	1991 (Rev. A) Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in (100 mm) Thick
ASTM A847	1990 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Allow Structural Tubing with Improved Atmospheric Corrosion Resistance

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Boiler and Pressure Vessel Code

ASME Section VIII, 1989 Rules for Construction of
Division 1 Pressure Vessels

AMERICAN WELDING SOCIETY (AWS)

AWS A2.4 1986 Standard Symbols for Welding, Brazing
and Nondestructive Examination

EXPANSION JOINT MANUFACTURER'S ASSOCIATION (EJMA)

EJMA 1980 Standards of the Expansion Joint
Manufacturers Association, Inc., 5th
Edition (Addenda 1985)

1.3 RELATED REQUIREMENTS

Specification Section 05060	Welding Structural
Specification Section 13252	Precautions for Fabrication, Handling and Storage of Stainless Steel and Nickel Alloys
Specification Section 15196	Identification and Tagging Methods for Mechanical Equipment
Drawing H-2-120395, Sheet 1	Mechanical Canister Storage Building (CSB) Standard/ Overpack Tube Assemblies
Drawing H-2-120395, Sheet 2	Mechanical CSB Standard/ Overpack Tube Details
Drawing H-2-120395, Sheet 3	Mechanical CSB Standard/ Overpack Tube Details
Drawing H-2-120396, Sheet 1	Mechanical CSB Standard/ Overpack Base Tube Assembly

1.4 DEFINITIONS

CMTR - Certified Material Test Report
CSB - Canister Storage Building
FAT - Factory Acceptance Test

1.5 **SYSTEM DESCRIPTION**

The storage tube assemblies store the canisters and overpacks vertically in a confined environment. The base tube assemblies, when anchored to the vault floor, receive and restrain the bottom end of the tube assemblies.

One end of the bellows is welded to the outside of the tube assembly. The free end of the bellows incorporates a flange that will be field-welded to the existing floor plug embed.

The funnel weldment provides a smooth transition between the inside of the floor plug embed and the tube assembly.

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 **Shop Drawings**

Seller shall prepare and submit fabrication and manufacturing drawings for Buyer approval. These drawings shall be based on drawings listed in Paragraph 1.3, this specification section and the following minimum requirements:

- A. All weld joint symbols and their interpretations shall be in accordance with AWS A2.4 except as otherwise indicated on drawings H-2-120395 and H-2-120396. Seller shall determine and specify all weld joint types and sizes.
- B. Applicable codes, standards and material type.
- C. Dimensioning and tolerancing shall be in accordance with ANSI Y14.5M. Surface texture symbols shall be in accordance with ANSI Y14.36.
- D. Assembly drawings shall indicate the weight of each assembly.

1.6.2 **The following procedures shall be submitted for Buyer approval:**

- A. Fabrication.
- B. Inspection.
- C. Repair.
- D. Factory Acceptance Tests (FATs). At minimum, these tests shall be in accordance with the requirements of Paragraph 2.4.

- E. Handling.
- F. Cleaning.
- G. Packaging. At minimum, these procedures shall be in accordance with the requirements of Paragraph 2.7.

1.6.3 Test Reports from:

- A. Inspection.
- B. Factory Acceptance Tests (FATs).

1.6.4 Certification Reports

1.6.4.1 Certified Material Test Reports (CMTRs) for the steel plates, bellows and bars shall be submitted for Buyer approval.

1.6.4.2 Certified Actual Dimensions Reports shall be provided for the inspection plug gauges. These reports shall be in accordance with Paragraph 2.3.1.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.8.1 Climatic Site Conditions

- A. Outside Temperature
 - 1) Maximum Temperature 115°F
 - 2) Minimum Temperature -27°F
 - 3) Relative Humidity Up to 100%

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Unless otherwise noted on drawings, materials shall be as follows:

2.1.1.1 Plates less than or equal to 1/2" thick shall be in accordance with ASTM A242/A242M, Type 1.

2.1.1.2 Plates greater than 1/2" thick shall be in accordance with ASTM A588/A588M, Grade A.

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- 2.1.1.3 The bellows design shall be in accordance both with ASME Section VIII, Div. 1 Appendix A, Appendix B and the Expansion Joint Manufacturers Association (EJMA) Standards.

The bellows material shall be in accordance with ASTM A240, Type 321. The welded attachments shall be in accordance with ASTM A588/A588M, Grade A.

The expected maximum length variations to be absorbed by the bellows are 4.4 inches in compression and 1.0 inches in extension. The bellows shall be designed for the following conditions:

- A. Temperature = -27°F to 280°F
- B. Internal pressure = 8 PSIG pressure
full vacuum
- C. Life = 40 years
- D. Cycles = ± 0.2 inches, once a day
(thermal)
 ± 1.6 inches, three
times a day (floor
deflection)
- E. Length absorption capacity = 6" compression, 3"
extension
- F. Allowable field set-up variance = $1/8$ " lateral offset
2 degrees angular
rotation

The clearance between the bellows inside diameter and the tube outside diameter shall be held to a minimum, but allow for unrestricted tube and bellow axial movement.

The standard tube bellows shall be Badger Industries Model No. 30.5-30LP-SFW5 or equal. The overpack tube bellows shall be Badger Industries Model No. 34.5-30LP-SFW5 or equal.

Each bellow's assembly shall be serialized and marked in accordance with Specification Section 15196, Type 1.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Fabrication

- 2.2.1.1 Tube assemblies, tube funnels and tube bases shall be fabricated in accordance with this specification section and July 13, 1993 Drawings H-2-120395 and H-2-120396.

- 2.2.1.2 The tube sections shall be fabricated in accordance with ASTM A847. Any inside welding flashes shall be ground flush with the inside diameters. Dimensions and tolerances shall be in accordance with drawings listed in Paragraph 1.3.
- 2.2.1.3 The tube connecting rings shall be made from rolled material joined by a full penetration weld or machined from solid plate.
- 2.2.1.4 The bellows connection to the storage tube shall be shop welded.
- 2.2.1.5 The inspection "go" plug gauges shall be fabricated in accordance with drawing H-2-120395.
- 2.2.1.6 All welding shall be performed in accordance with Specification Section 05060. All welds shall be seal welds.
- 2.2.1.7 Fabrication and cleaning of stainless steel shall be in accordance with Specification Section 13252.

2.3 INSPECTION

- 2.3.1 The plug gauges shall be inspected in accordance with Drawing H-2-120395. Actual gauging forms and dimensions shall be recorded.
- 2.3.2 All tube funnels, tube assemblies and tube bases shall be fully inspected in accordance with drawings listed in Paragraph 1.3.
- 2.3.3 Welding inspection shall be in accordance with Specification Section 05060. All welds, others than those described below, shall be examined by the magnetic particle method. The funnel assembly and the bottom tube inside guide bar welds shall be visually examined.
- 2.3.4 Each tube assembly shall accept, without interference, their respective inspection plug gauges.

2.4 FACTORY ACCEPTANCE TEST (FAT)

2.4.1 Cyclic Tests

The cyclic tests shall consist of the following tests:

- A. A life cyclic test which duplicates the life expectancy of the bellows, run on a qualified quantity.
- B. An infant mortality cycle test, required for all bellows, purposely run to detect any gross defects.

2.4.1.1 Life Cyclic Test

2.4.1.1.1 Thirteen (13) of the standard bellows assemblies and two (2) overpack bellows assemblies (no less than one from each material heat number) shall be submitted for life cyclic test. Bellows to be tested shall be selected by Buyer. Buyer shall permanently identify each selected bellows with a personal stamp and date.

2.4.1.1.2 The test shall meet the following conditions:

- A. Testing temperature - Ambient
- B. Lateral deflection - $.125" \pm .015"$
- C. Angular rotation - $2^\circ \pm .25^\circ$
- D. Number of cycles - Not less than 90,000
- E. Set-up dimension - Bellows nominal preset dimension is 3" of the length compressed
- F. Each cycle shall include a compression movement of 2" from the preset dimension. This shall be followed by a return to the preset dimension.

2.4.1.1.3 Each bellows shall receive a complete visual examination once the cyclic test is completed. The bellows shall not have any deformations or anomalies caused by the testing.

2.4.1.1.4 Each bellows and its associated welds shall be liquid penetrant examined after visual inspection is complete. Examination shall be in accordance with Specification Section 05060.

2.4.1.1.5 A pneumatic pressure test shall be performed in accordance with ANSI B31.3. The test pressure shall be 12 psig. Pressure shall be held for not less than 30 minutes without pressure decay.

2.4.1.1.6 Any bellows used for the life cyclic test shall not be part of the contract quantity. All tested bellows shall become Buyer property.

2.4.1.1.7 A vacuum test shall be performed. The test pressure shall be between -12 and -13 psig, inclusive. Pressure shall be held for not less than 30 minutes without pressure increase.

2.4.1.1.8 If any bellows fails the life cyclic test, that bellows design shall be considered unacceptable. Seller shall investigate the cause of the failure and submit a report to Buyer. This report shall include proposed corrective action.

2.4.1.2 Infant Mortality Cyclic Test

2.4.1.2.1 All bellows assemblies (standard and overpack) shall be subjected to the infant mortality cyclic test.

2.4.1.2.2 The test shall meet the following conditions:

- A. Testing temperature - Ambient
- B. Lateral deflection - $.125" \pm .015"$
- C. Angular rotation - $2^\circ \pm .25^\circ$
- D. Number of cycles - 5000 to 6000
- E. Set-up dimension - Bellows nominal preset dimension is 3" of the length compressed
- F. Each cycle shall include a compression movement of 2" from the preset dimension. This shall be followed by a return to the preset dimension.

2.4.1.2.3 Each bellows shall receive a complete visual examination once the infant mortality test is completed. The bellows shall not have any deformations or anomalies caused by the testing.

2.4.1.2.4 Each bellows and its associated welds shall be liquid penetrant examined after visual inspection is complete. Examination shall be in accordance with Specification Section 05060.

2.4.1.2.5 A pneumatic pressure test shall be performed in accordance with ANSI B31.3. The test pressure shall be 12 psig. Pressure shall be held for not less than 10 minutes without pressure decay.

2.4.1.2.6 Any defects found during the above tests shall be reported to Buyer. Any required repair shall be made in accordance with Buyer-approved procedures. All repaired bellows shall be subjected to an infant mortality retest. Any bellows failing a second such infant mortality test shall be rejected.

2.4.2 Pneumatic Pressure Test

2.4.2.1 A pneumatic pressure test shall be performed on all storage tube/bellows assemblies in accordance with ANSI B31.3. The test pressure shall be 12 psig. Pressure shall be held for not less than one hour. If required, any weld repair shall be made in accordance with Specification Section 05060. A new pressure test shall be performed following any repair.

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- 2.4.2.2 Buyer shall be informed in advance of the date that factory tests are to be conducted. Buyer reserves the right to attend and witness all factory tests.

2.5 **CLEANING**

All material furnished under this specification section shall be thoroughly cleaned. All water, sand, grit, weld spatter, grease, oil and other foreign material shall be removed before packaging begins.

2.6 **HANDLING**

A lifting device shall be furnished and used for the vertical handling of the tube assemblies. The (3) .78 diameter lifting holes located at the top end of the tubes shall be used for attachment.

2.7 **PACKAGING**

All assemblies shall be packaged to prevent damage to the tube and bellows during shipping, handling and storage.

PART 3 EXECUTION

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 13096
CANISTER/OVERPACK - FLOOR PLUG EMBEDS
B-595-C-E350-13096

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-859 & DCN-0045
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QUALITY LEVEL I ☒ II ☐
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ORIGINATOR:

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CPW for 7-14-93
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D. A. Buzzelli, Lead Mech. Checker Date

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7-14-93
Date

SECTION 13096
CANISTER/OVERPACK - FLOOR PLUG EMBEDS
B-595-C-E350-13096

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SECTION 13096
CANISTER/OVERPACK - FLOOR PLUG EMBEDS

PART 1 GENERAL

1.1 SUMMARY

This specification section describes the minimum technical requirements for the fabrication, inspection, testing and handling of the floor plug embeds, floor plug embed inspection gauges and the impact absorber storage.

1.2 REFERENCES

The publications listed below form a part of this specification section to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Y14.36	1978 (Rev. 87) Surface Texture Symbols
ANSI Y14.5M	1982 (Rev. 88) Dimensioning and Tolerancing

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B31.3	1990 Chemical Plant and Petroleum Refinery Piping
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A108	1990 Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A242/A242M	1991 (Rev. A) Standard Specification for High-Strength Low-Alloy Structural Steel
ASTM A588/A588M	1991 (Rev. A) Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in (100 mm) Thick
ASTM A847	1990 Standard Specification for Cold-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance

AMERICAN WELDING SOCIETY, INC. (AWS)

AWS A2.4 1986 Standard Symbols for Welding, Brazing
and Nondestructive Examination

1.3 **RELATED REQUIREMENTS**

Specification Section 05060	Welding Structural
Drawing H-2-120005, Sheet 1	Mechanical Canister Storage Building (CSB) Standard Floor Plug Embed
Drawing H-2-120005, Sheet 2	Mechanical CSB Overpack Floor Plug Embed
Drawing H-2-120005, Sheet 3	Mechanical CSB Floor Plug Embed Inspection Gauges
Drawing H-2-120087	Mechanical CSB Standard/Overpack Impact Absorber Storage

1.4 **DEFINITIONS**

CMTR - Certified Material Test Report

CSB - Canister Storage Building

FAT - Factory Acceptance Test

1.5 **SYSTEM DESCRIPTION**

This specification section covers the embeds to be located in the operating floor of the canister storage building. The top end of the embeds are level with the floor and receive the floor plugs. The lower end of the embeds protrude below the floor and support the holding tubes.

Also included is a single impact absorber storage for the staging of an impact absorber. The impact absorber storage is also located on the operating floor of the canister storage building. The impact absorber storage top end is level with the floor and includes a cover. The cavity inside the impact absorber storage is designed for the storage of any size impact absorber.

1.6 **SUBMITTALS**

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Shop Drawings

Seller shall prepare and submit fabrication and manufacturing drawings for Buyer approval. These drawings shall be based on Buyer-furnished drawings, this specification section and the following minimum requirements:

- A. All weld joint symbols and their interpretation shall be in accordance with AWS A2.4. Except as otherwise indicated on drawings listed in Paragraph 1.3, Seller shall determine and specify all weld joint types and sizes.
- B. Applicable codes, standards and material type.
- C. Dimensioning and tolerancing shall be in accordance with ANSI Y14.5M. Surface texture symbols shall be in accordance with ANSI Y14.36.

1.6.2 The following procedures shall be submitted for Buyer approval:

- A. Fabrication.
- B. Inspection.
- C. Factory Acceptance Tests (FATs). At minimum, these tests shall be in accordance with the requirements of Paragraph 2.4.
- D. Cleaning.
- E. Handling.
- F. Packaging. At minimum, these procedures shall be in accordance with the requirements of Paragraph 2.7.

1.6.3 Test reports from:

- A. Inspection.
- B. Factory Acceptance Tests (FATs).

1.6.4 Certification Reports

1.6.4.1 Certified Material Test Reports (CMTRs) for the steel plates, shapes and headed weld studs shall be submitted for Buyer approval.

1.6.4.2 Certified Actual Dimensions Reports shall be provided for the inspection embed tube gauges. These reports shall be prepared in accordance with Paragraph 2.3.1.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.8.1 Climatic Site Conditions

A. Outside Temperature

- | | | |
|----|---------------------|------------|
| 1) | Maximum Temperature | 115°F |
| 2) | Minimum Temperature | -27°F |
| 3) | Relative Humidity | Up to 100% |

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Unless otherwise noted on drawings, materials shall be as follows:

2.1.1.1 Plates greater than 1/2" thick shall be in accordance with ASTM A588/A588M, Grade A.

2.1.1.2 Plates less than or equal to 1/2" thick shall be in accordance with ASTM A242/A242M, Type 1. Material of structural shapes shall be in accordance with ASTM A242/A242M, Type 1, Group 1.

2.1.1.3 Deleted.

2.1.1.4 The headed weld studs shall be in accordance with ASTM A108 Grade C-1010/C-1020. (TRW Nelson part number 101-053-047 or equal).

2.2 FABRICATION AND MANUFACTURE

2.2.1 Floor Plug Embed Fabrication.

2.2.1.1 The floor plug embeds shall be fabricated in accordance both with drawing H-2-120005 and this specification section.

2.2.1.2 All welding shall be performed in accordance with Specification Section 05060.

2.2.1.3 All inside welds on floor plug embeds and debris traps shall be seal welds.

2.2.1.4 Inside annular section welds shall be ground smooth and flush with inside diameters.

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- 2.2.1.5 The welded embed annular sections shall be fabricated in accordance with ASTM A847. Dimensions and tolerances shall be in accordance with drawing H-2-120005.
- 2.2.1.6 The peripheric debris trap shall be fabricated from rolled plate.
- 2.2.1.7 Flange sealing surface shall be smooth and free of weld splash, crevices, indentations, depressions and radial marks. Concentric tool marks are acceptable provided they do not exceed .005 inches in depth. This is in addition to drawing H-2-120005 criteria.
- 2.2.1.8 The inspection embed tube gauges shall be fabricated in accordance with drawing H-2-120005.
- 2.2.2 Impact Absorber Storage Fabrication.
- 2.2.2.1 The impact absorber storage shall be fabricated in accordance both with drawing H-2-120087 and this specification section.
- 2.2.2.2 All welding shall be performed in accordance with Specification Section 05060.
- 2.2.2.3 The annular section shall be fabricated in accordance with ASTM A847. Tolerances shall be in accordance with drawing H-2-120087.

2.3 INSPECTION

- 2.3.1 The inspection embed tube gauges shall be inspected in accordance with drawing H-2-120005. Actual gauging forms and dimensions shall be recorded.
- 2.3.2 All welding shall be 100 percent visually inspected. Acceptance criteria shall be in accordance with Specification Section 05060.
- 2.3.3 Each floor plug embed shall be inspected for conformance to drawing H-2-120005 and Paragraphs 2.2.1.3, 2.2.1.4 and 2.2.1.7 of this specification section.

Each plug embed shall accept the inspection embed tube gauges without interference.

2.4 FACTORY ACCEPTANCE TEST

- 2.4.1 The floor plug embed shall be pressure tested in accordance with ASME B31.3. This test shall include the top flange sealing surface. Test pressure shall be 15 psig. Pressure shall be held for not less than 20 minutes. Any required weld repair shall be made in accordance with Specification Section 05060. After each repair the floor plug embed shall be retested.

- 2.4.2 Buyer shall be informed in advance of the date that factory tests are to be conducted. Buyer reserves the right to attend and witness all factory tests.

2.5 **CLEANING**

All material furnished under this specification section shall be thoroughly cleaned. All water, sand, grit, weld spatter, grease, oil and other foreign material shall be removed before shipment preparation begins.

2.6 **HANDLING**

Lifting devices attached to the welded studs or bracing shall be used to handle the embed.

2.7 **PACKAGING**

Temporary braces shall be tack-welded to the larger open end. Secured covers shall be used to protect the top sealing face and lower inside recessed flange. The top cover shall be a doughnut shape to protect the sealing top surface and allow complete access to the embed inside diameter. Each finished floor plug embed and impact absorber storage shall be packaged to prevent damage during normal handling and storage.

PART 3 EXECUTION

(Not Used)

END OF SECTION

U.S. DEPARTMENT OF ENERGY
Hanford Waste Vitrification Plant
Richland, Washington
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.
Advanced Technology Division
Fluor Contract 8457

SECTION 13099
CANISTER/OVERPACK - STORAGE TUBE INSTALLATION
B-595-C-E350-13099

APPROVED FOR CONSTRUCTION

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ORIGINATOR:

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CW for 7-14-93
R. L. Fages, Mechanical Engineer Date

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D. A. Buzzelli, Lead Mech. Checker Date

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7-14-93
Date

SECTION 13099
CANISTER/OVERPACK - STORAGE TUBE INSTALLATION
B-595-C-E350-13099

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ATTACHMENTS

<u>ATTACHMENT</u>	<u>TITLE</u>
A	STORAGE TUBE INSTALLATION DRAWINGS
B	REFERENCE DRAWINGS

SECTION 13099
CANISTER/OVERPACK - STORAGE TUBE INSTALLATION

PART 1 GENERAL

1.1 SUMMARY

This specification section describes the minimum technical requirements for the preparation, installation, inspection and testing of the storage tubes. This specification section also covers fabrication and installation of the temperature probe pipes.

1.2 REFERENCES

The publications listed below form a part of this specification section to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.9	1986 Factory-Made Wrought Steel Buttwelding Fittings
ANSI B31.3	1990 Chemical Plant and Petroleum Refinery Piping
ANSI Y14.5M	1982 Dimensioning and Tolerancing
ANSI Y14.36	1978 Surface Texture Symbols

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A53	1990 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A242/A242M	1991 (Rev. A) Standard Specification for High-Strength Low-Alloy Structural Steel
ASTM A312/A312M	1991 Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes
ASTM A403/A403M	1991 Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings

ASTM A563

1991 Standard Specification for
Carbon and Alloy Steel Nuts

AMERICAN WELDING SOCIETY, INC. (AWS)

AWS A2.4

1986 Symbols for Welding, Brazing
and Nondestructive Examination

1.3 RELATED REQUIREMENTS

Specification Section 03600

Grout

Specification Section 05060

Welding Structural

Specification Section 05062

Welding Piping

Drawings are listed in Attachment A and B

1.4 DEFINITIONS

CAT - Construction Acceptance Test

CMTR - Certified Material Test Report

1.5 SYSTEM DESCRIPTION

The storage tubes are located in the canister storage building. Two types of holding tubes are used to vertically store the canisters and overpacks in a confined, controlled environment.

The lower end of each tube is located and restrained by a base tube assembly. This in turn is anchored to the vault floor. The upper end of each tube has a flange. This flange is located inside the floor plug embed counterbore. The flange is then welded to the counterbore. A funnel weldment is welded to the storage tube upper end to complete the tube installation.

Temperature probe pipes are installed at selected locations following sequential tube installation. Supports for the temperature probe pipes are welded to the storage tube.

Seller shall design and fabricate any necessary tools or special equipment required for installation, inspection or testing. Seller shall also design and fabricate the temperature probe pipes, their supports and routing within the vault.

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Shop Drawings

Fabrication Drawings - Detail fabrication drawings of the temperature probe pipes and pipe supports shall be submitted for Buyer approval. These drawings shall be based on drawings listed in Attachment A, this specification section and the following minimum requirements:

- A. Applicable codes, standards and material type.
- B. Except as otherwise indicated on drawing H-2-120397 (Attachment A), Seller shall specify all weld joint types and sizes. They shall be in accordance with AWS A2.4.
- C. Dimensions and tolerancing shall be in accordance with ANSI Y14.5M.
- D. Surface texture symbols shall be in accordance with ANSI Y14.36.

1.6.2 Seller shall submit the following procedures for Buyer approval:

- A. Fabrication.
- B. Installation.
- C. Inspection.
- D. Grout installation and curing.
- E. Construction Acceptance Tests (CATs). At minimum, these tests shall be in accordance with the requirements of Paragraphs 3.2.2.8 and 3.3.3.
- F. Cleaning.
- G. Handling.

1.6.3 Test reports from:

- A. Inspection.
- B. Construction Acceptance Tests (CATs).

1.6.4 Certification Reports

1.6.4.1 Certified Material Test Reports (CMTRs) for the pipes, pipe fittings, steel bars, studs, nuts and grout shall be submitted for Buyer approval.

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

Climatic Site Conditions

A. Outside Temperature

- 1) Maximum Temperature 115°F
- 2) Minimum Temperature -27°F
- 3) Relative Humidity Up to 100%

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 Unless otherwise noted on drawings, materials shall be as follows:

2.1.1.1 Pipe material shall be Schedule 40S in accordance with ASTM A312/A312M, Grade 304L. Pipe ends shall be beveled.

2.1.1.2 Material for butt weld pipe fittings shall be Schedule 40S in accordance with ASTM A403/A403M, Grade WP304L, ANSI B16.9.

2.1.1.3 Nuts shall be in accordance with ASTM A563, Grade C3. An additional 5% of the required quantity shall be supplied as spares. Nuts shall be packaged for field use.

2.1.1.4 Threaded weld studs shall be made from material equal to ASTM A242, Type 1, chemical composition. An additional 5% of the required quantity shall be supplied as spares. Studs shall be packaged for field use.

2.1.1.5 Material for the temperature probe pipe supports shall be in accordance with ASTM A242/A242M, Type 1. Material for structural shapes shall be in accordance with ASTM A242/A242M, Type 1, Group 1.

2.1.1.6 Material for pipe sleeve shall be Schedule 80 in accordance with ASTM A53, Type F. Material for pipe sleeve ends shall be in accordance with ASTM A242/A242M, Type 1.

2.2 FABRICATION AND MANUFACTURE

2.2.1 Fabrication

2.2.1.1 Seller shall design and fabricate any necessary tools or special equipment required for installation, inspection or testing.

2.2.1.2 The pipe runs and pipe supports shall be fabricated in accordance with drawings H-2-120397 (Attachment A) and H-2-121202 (Attachment B). They shall also be fabricated in accordance with this specification section.

2.2.1.3 All welding shall be performed in accordance with Specification Sections 05060 and 05062.

PART 3 EXECUTION

3.1 PREPARATION

At minimum, the following steps shall be performed:

3.1.1 Floor Plug Embed Preparation Procedure (Refer to drawing H-2-120143, Attachment A)

At the time of storage tube installation, the floor plug embeds and vault floor embeds have been installed and cast in concrete by others. The forms supporting the floor have been removed.

3.1.1.1 The covers which protect the upper sealing face and the bottom inside counterbore shall not be removed.

3.1.1.2 Use an abrasive cutoff wheel to remove the plug embed upper braces. The use of cutting torches for this step shall not be permitted. Any remaining brace weld attachment material shall be ground flush with the embed inside diameter.

3.1.1.3 The plug embed inside surfaces shall be thoroughly cleaned after upper braces are removed.

3.1.1.4 Remove the cover from the bottom inside counterbore.

3.1.1.5 Use a Seller-furnished fixture to transfer the plug embed counterbore's actual vertical centerline to the vault floor. Mark the location.

3.1.1.6 At the location defined in Paragraph 3.1.1.5, drill a vertical hole. This hole shall be 1/2 inch in diameter and 2 inches maximum in depth. Place a 1/2-inch diameter pin in the hole. This pin shall protrude not less than 6 inches from the floor.

3.1.2 Storage Tube Preparation Procedure

3.1.2.1 All storage tube surfaces shall be thoroughly cleaned.

3.1.2.2 Remove the bellows shipping restraints.

3.1.2.3 Storage tube and bellows shall be visually inspected.

3.1.2.4 Install and secure the lifting device (shown on Sheet 3 of drawing H-2-120395, Attachment B) to the upper end of the storage tube.

3.2 **INSTALLATION, APPLICATION and ERECTION**

At minimum, the following steps shall be performed:

3.2.1 Tube Base Installation Procedure (Refer to drawing H-2-120143, Attachment A)

3.2.1.1 Use the 1/2 inch diameter pin installed in Paragraph 3.1.1.6 to locate the center of the tube base (drawing H-2-120396, Attachment B). The pin shall be vertical.

3.2.1.2 Rotate the tube base around the pin until the four (4) tube base anchor holes are centered with the existing vault floor embed. Transfer the centerlines of the anchor holes to the floor embed. Prepare embed for welding in accordance with Specification Section 05060.

3.2.1.3 Weld four (4) studs to the floor embed in accordance with Specification Section 05060.

3.2.1.4 Use the leveling and locking nuts to adjust the dimension to the floor plug embed and level of the tube base in accordance with drawing H-2-120397. Lock tube base in place.

3.2.1.5 Remove the 1/2 inch diameter centering pin. Check tube base location in accordance with Paragraph 3.1.1.5. Adjust location if required.

3.2.1.6 Prepare vault floor for grouting in accordance with Specification Section 03600.

3.2.1.7 Locate and secure forms around the tube base.

3.2.1.8 Grout the tube base to vault floor in accordance with Specification Section 03600. The cavity shall be completely filled with grout. The three (3) grouting access holes shall be grouted flush with the tube base plate top.

3.2.2 Tube Installation (Refer to drawing H-2-120143, Attachment A)

3.2.2.1 The tube installation shall be initiated only after complete curing of the tube base grout. The tube shall be handled only with the lifting device shown on drawing H-2-120395, Sheet 3 (Attachment B).

3.2.2.2 Clean and inspect the plug embed bottom counterbore and the top face of the tube base.

3.2.2.3 Lower the tube assembly inside the plug embed. Stop the lowering of the tube when the bellows is two to three feet above the bottom face of the plug embed.

3.2.2.4 Attach at least three (3) Seller-furnished temporary tube guides, equally spaced, to the outside flange of the plug embed. Using the tube guide jack screws, center the tube to the opening of the plug embed.

3.2.2.5 Resume the lowering of the tube storage assembly. Guide the bottom of the tube inside the tube base and the bellows flange inside the plug embed counterbore.

The bottom of the tube shall contact the tube base plate. The top of the bellows flange shall be flush with the bottom inside face of the plug embed. The inside diameter of the bellows flange shall clear the outside diameter of the tube. The bottom plate of the tube shall contact the top plate of the tube base.

3.2.2.6 Visually inspect the bellows for any damage. Indentations, deformations, marks and other defects weakening the bellows performance shall be reason for rejection. The tube shall be removed for rework.

3.2.2.7 Remove the lifting device.

3.2.2.8 Inspect the tube storage for functionality:

A. Insert the canister or overpack tube plug gauge, shown on drawing H-2-120395, Sheet 1 (Attachment B), inside their specific tube. The tube on its full length shall accept the tube plug gauge without interference.

B. Insert the canister or overpack impact absorber plug gauge, shown on drawing H-2-120395, Sheet 2 (Attachment B), inside their specific tube. The impact plug gauges shall be lowered to their specified place without undue interference.

If any interference is found the tube shall be removed for rework.

Buyer shall be informed in advance of the functionality inspection date. Buyer reserves the right to attend and witness the functionality inspection.

- 3.2.2.9 Remove the temporary tube guides.
- 3.2.2.10 Lower the Seller-furnished welding stand into the tube.
- 3.2.2.11 Weld the bellows flange to the bottom inside face of the plug embed in accordance both with drawing H-2-120397 and Specification Section 05060.

3.2.3 Temperature Probe Lines Installation (Refer to drawing H-2-120397, Attachment A)

This paragraph covers only the temperature probe line routing and support inside the vault.

- 3.2.3.1 The temperature probe lines shall be installed when a row of tubes intended to support the probe lines is completed. Installation shall be performed before the next row of tubes is installed. The temperature probe lines shall be routed in accordance with drawing H-2-121202 (Attachment B). They shall be supported in accordance with drawing H-2-120397 (Attachment A).
- 3.2.3.2 The number of pipe sections shall be kept to a minimum. Pipes shall be butt welded in accordance with Specification Section 05062. After butt welding, the inside pipe diameter at the joint shall not be smaller than 5/8 inch. Pipe supports shall be welded in accordance both with drawing H-2-120397 (Attachment A) and Specification Section 05060. Pipe ends shall be capped 27 inches away from the last pipe support.
- 3.2.3.3 All pipe welding shall be liquid penetrator examined in accordance with Specification Section 05062. All other welding shall be 100% visually examined in accordance with Specification Section 05060.
- 3.2.3.4 Pipe cleaning and testing are outside the scope of this specification section.
- 3.3 **CONSTRUCTION QUALITY CONTROL**
 - 3.3.1 The weld described in Paragraph 3.2.2.11 shall be 100% magnetic particle examined in accordance with Specification Section 05060.
 - 3.3.2 The completed tube installation shall be tested either by pneumatic pressure test or vacuum test.

3.3.3 Pneumatic Pressure Test Procedure

3.3.3.1 Remove the cover from the upper seal face of the plug embed.
Clean and inspect the sealing surface.

3.3.3.2 Select the floor plug (drawing H-2-120394, Attachment B) with the serial number corresponding to the floor opening as shown on drawing H-2-120397 Sheet 2 (Attachment A). Inspect both the seal and sealing face. Use the dedicated floor plug grapple to insert the plug inside the plug embed.

3.3.3.3 Screw a sealed pressure gauge to the plug HEPA filter exhaust.

3.3.3.4 Perform a pressure test on the tube storage assembly. The pressurized air used for the test shall be dry, clean and free of oil and dirt. The floor plug's 1/2-inch pipes and valves shall be used for this test. The test pressure shall be between 3.5 psig and 4 psig. Before the start of the test, enough time shall be allowed for the pressurized air temperature to equal the temperature of the tube storage assembly. This pressure shall be held for not less than one hour. The test shall be in accordance with ANSI B31.3. The final gauge reading shall be corrected in accordance with any temperature and barometric pressure variations occurring during pneumatic testing.

3.3.3.5 After completion of the pneumatic test, remove the pressure gauge.

3.3.3.6 Remove the floor plug.

3.3.4 Any required weld repair shall be made in accordance with Specification Section 05060. Pressure test shall be repeated after repair is complete.

Buyer shall be informed in advance of the test date. Buyer reserves the right to attend and witness pressure tests.

3.3.5 Lower the tube funnel (drawing H-2-120395 Sheet 2, Attachment B) on top of the tube assembly. Center the funnel. The funnel shall not contact the inside diameter of the plug embed.

3.3.6 Weld the flare to the tube in accordance both with drawing H-2-120397 (Attachment A) and Specification Section 05060. Visually examine the weld in accordance with Specification Section 05060.

3.3.7 Remove the welding stand from the storage tube.

3.3.8 Thoroughly clean and remove any debris from inside the plug embed and tube assembly.

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3.3.9 Replace the floor plug described in Paragraph 3.3.3.2 inside the floor plug embed.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

END OF SECTION

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ATTACHMENT A
STORAGE TUBE INSTALLATION DRAWINGS

DRAWING NUMBER	SHEET NUMBER	TITLE
H-2-120143	1	Mechanical CSB Standard/Overpack Tube Installation
H-2-120143	2	Mechanical CSB Standard/Overpack Tube Installation Details
H-2-120143	3	Mechanical CSB Standard/Overpack Tube Installation Details
H-2-120397	1	Mechanical CSB Standard/Overpack Storage Assemblies
H-2-120397	2	Mechanical CSB Temperature Probe Line Assembly
H-2-120397	3	Mechanical CSB Temperature Probe Line Details

ATTACHMENT B
REFERENCE DRAWINGS

DRAWING NUMBER	SHEET NUMBER	TITLE
H-2-120394	1	Mechanical CSB Standard Floor Plug Assembly
H-2-120394	2	Mechanical CSB Overpack Floor Plug Assembly
H-2-120395	1	Mechanical CSB Standard/Overpack Tube Assemblies
H-2-120395	2	Mechanical CSB Standard/Overpack Tube Details
H-2-120395	3	Mechanical CSB Standard/Overpack Tube Details
H-2-120396	1	Mechanical CSB Standard/Overpack Base Tube Assembly
H-2-121202	1	Instrument - Canister Storage Building Location Plan